FILE NO.

SANYO

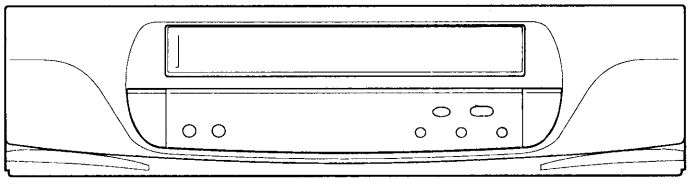
SERVICE MANUAL

Video Cassette Recorder

VHR-767E
(Product Code : 143 171 09)
(U.K.)

VHR-777E
(Product Code : 143 171 08)
(U.K.)

VHR-787G
(Product Code : 143 171 28)
(Germany)



(VHR-767E)

VHS
PAL

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CIRCUIT DIAGRAMS (Refer to the separate volume)

Please see other materials with Reference number given in table below.

Materials	Model No.	Reference No.
Mechanism Manual	V95 I Mechanism	MM531433
	V95 II Mechanism	MS531500

PRODUCT SAFETY NOTICE

The components designated by a symbol (⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the parts List. Do not deviate from the resistance, wattage, and voltage ratings shown.

NOTE: 1. Parts order must contain model number, part number, and description.
2. Substitute parts may be supplied as the service parts.
3. N.S.P. : Not available as service parts.

Design and specifications are subject to change without notice.

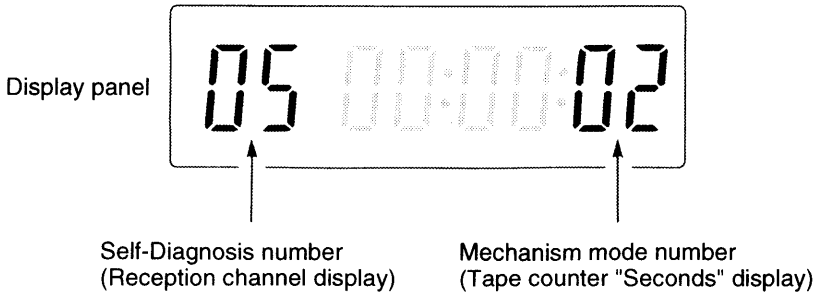
SELF-DIAGNOSIS DISPLAY

Mechanism Mode Display / Head Output Drop Warning Display / Cylinder Rotation Accumulated Time Display

This unit displays the diagnosis contents of abnormalities and the mechanism, mode on its display panel in 2-digit numbers.
When the head playback output has dropped, the "L" sign will be blinked. Some models (listed later) will also display the cylinder rotation accumulated time.
These display shows the outline of the problems. Use it as a reference when servicing the unit.

1. Self-Diagnosis Contentes and Mechanism Mode Display

- When the STOP button on the remote control is pressed for about 10 seconds continuously, the self-diagnosis number will be displayed on the reception channel display of the display panel and number indicating the failed mechanism mode (changed mode when being shifted) on the tape counter "seconds" display for 10 seconds each.
- During self-diagnosis display, displays other than the diagnosis number/mechanism mode number and the cylinder accumulated rotation time display described later (some models only) will be turned off and when displays end, the normal display will be returned automatically.
- Refer to "Self-Diagnosis Contents" for the self-diagnosis numbers and the "Mechanism Mode Display Contents" for the mechanism mode numbers.
- When the "0" button on the remote control unit is pressed during display, and clearing the self-diagnosis display and mechanism mode display.



Self-Diagnosis Contents

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
00	There is no abnormality in the mechanism.		
01	The cylinder motor does not rotate.	• The cylinder motor is faulty. • The control of the cylinder motor is faulty. • The tape winds around the cylinder.	Shifts to the STOP mode.
02	The take-up reel does not rotate.	• The take-up reel is caught. • The reel belt is faulty. • The take-up torque has decreased.	Shifts to the STOP mode.
03	The capstan motor does not rotate.	• The capstan motor is faulty. • The control of the capstan motor is faulty.	Shifts to the STOP mode.
04	The tape cannot be loaded with the cassette inserted. (But unloading can be performed.)	• Error in the operations of the tape loading mechanism. • Foreign particles in the tape loading mechanism. • The tape end sensor is faulty. • The reel brake of the tape cassette has not been released.	Unloads, shifts to the INITIAL mode, and the power goes off.
05	Tape loading and unloading cannot be performed with the cassette inserted.	• The tape guide is caught. • The loading motor is faulty. • The control of the loading motor is faulty.	The power is forcibly turned off with the mechanism at its current position.

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
06	Front unloading cannot be performed when ejecting the cassette. (Front loading can be performed.)	• The cassette drive mechanism is faulty. • The front door is caught.	Front loads and shifts to the STOP or INITIAL mode. • When the power switch is turned on before eject operations: Shifts to the STOP mode. • When the power switch is turned off before eject operations: Shifts to the INITIAL mode and the power goes off.
07	Front loading and front unloading cannot be performed when ejecting the cassette.	• The tape cassette is caught in the cassette drive mechanism. • The main cam and front rack gear of the front loading mechanism have not engaged properly. • The gears of the front loading drive mechanism have not engaged properly.	The power is forcibly turned off with the mechanism at its current position.
08	The mechanism becomes 1 (REVIEW) while moving from 2 (IDLER), 3 (STILL), 4 (BRAKE), and to 5 (STOP).	• The mechanism mode switch contact is faulty.	The power is forcibly turned off with the mechanism at its current position.
09	The mechanism becomes 7 (INITIAL) while moving from 1 (REVIEW), 2 (IDLER), 3 (STILL), 4 (BRAKE), and to 5 (STOP).	• The mechanism mode switch contact is faulty.	Carries out tape take-up operations, shifts to the INITIAL mode, and the power goes off.

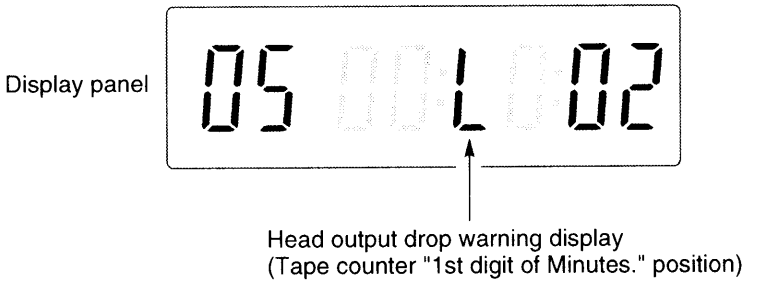
Note: For details of mechanism operations corresponding to the mechanism positions of the self-diagnosis numbers 08 and 09 above, refer to the separate volume on the V95 I mechanism manual. These manual reference numbers are shown in the cover.

Mechanism Mode Display Contents

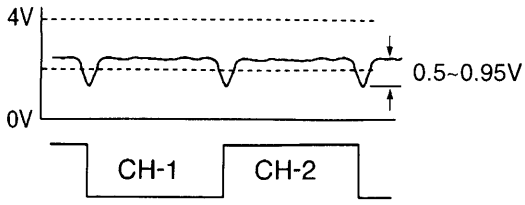
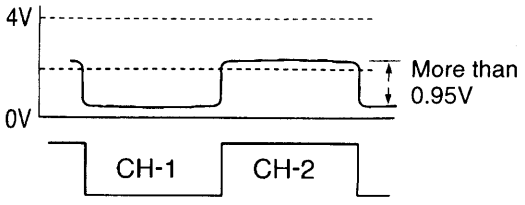
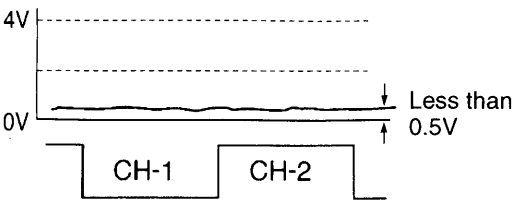
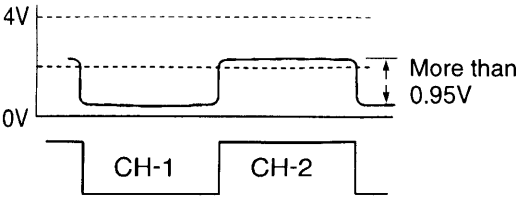
Mode No.	Mechanism Mode	Mode No.	Mechanism Mode	Mode No.	Mechanism Mode
00	CASSETTE OUT	08	PLAY	16	VIDEO INSERT
01	STANDBY	09	REC	17	VIDEO INSERT-PAUSE
02	STOP	10	AUDIO DUBBING	18	AUDIO/VIDEO INSERT
03	STILL	11	X2 SPEED PLAY	19	REVERSE X2 SPEED PLAY
04	REC-PAUSE	12	CUE		
05	AUDIO DUBBING-PAUSE	13	REVIEW		
06	FRAME ADVANCE	14	FAST FORWARD		
07	SLOW	15	REWIND	99	OTHERS

2. Head Output Drop Warning Display

- When the STOP button on the remote control is pressed for 10 seconds continuously 10 seconds after play starts, "L" will be displayed blinking at the first digit of the minutes position on the tape counter when the head output is lower than the specified value to indicate an abnormality.
- The cause of the abnormality may be due to drop in the playback output caused by drop in the efficiency of the cassette used or head clogging. Refer to "Head Playback Output Voltage Check" as a means to judge the abnormality.

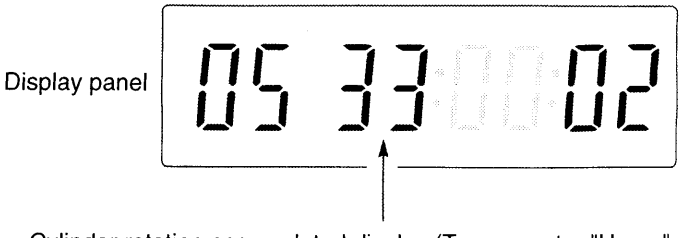


Head playback output voltage check

Cassette Used	Warning Display	Envelope Detection Output Voltage	Main Cause
Cassette with normal playback output	–	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is 0.5 to 0.95V • The video heads of both are normal
Recorded cassette (with tabs)	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is more than 0.95V • Tracking adjustment has not been performed accurately • One video head is clogged • One video head has worn out
	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the average output voltage of the two channels is less than 0.5V • Tracking adjustment has not been performed accurately • Both video heads are clogged • Both video heads have worn out
Rental cassette (without tabs)	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is more than 0.95V • Tracking adjustment has not been performed accurately • One video head is clogged • One video head has worn out
	• Some rental cassettes may have extremely low video playback outputs even when both video heads are normal. As the average output voltage of the two heads may be less than 0.5V for some, no warning displays will be shown.		

3. Cylinder rotation accumulated time display

- Press the STOP button on the remote control for approximately 10 seconds and the cylinder rotation accumulated time excluding the cassette out and standby operation time will be displayed on the "Hours" display in units of 100 hours. ("33" will be displayed for 10 seconds for 3,200 to 3,299 hours.)
- To erase the cylinder rotation accumulated time display, press the RESET button on the remote control during the accumulated time display.



1. DISASSEMBLY

1-1. REMOVAL OF CABINET, MECHANISM UNIT, AND MAIN BOARD

REMOVING THE CABINET PARTS (Fig. 1-1-1)

1. Remove the cabinet and bottom cover by removing the four screws ① and four screws ②.
2. Remove the front panel by removing the locks of the clamps (A) using a screwdriver, etc. and slightly rotating the bottom part in the direction of the arrow.

Notes: • Electrical adjustments for the this model can be performed with only the cabinet removed.
• When replacing the bottom cover, do not tighten the screws ② too much. Excess tightness may damage the screws taps on the chassis.

REMOVING THE MECHANISM MAIN UNIT AND THE CP-1 PWB ASSEMBLY (Fig. 1-1-2 and 1-1-3)

After removing the cabinet parts, remove the mechanism unit and the CP-1 PWB assembly connected as follows.

1. Spread out the lock clamps (C) in the arrow direction slightly and remove the TM-1 PWB as shown in Fig. 1-1-2.
2. Remove the screw ④ at the chassis.
3. Remove the screw ⑤ in the chassis, the screw ⑥, and the holder in this order.
4. Remove the two screws ⑦ and two screws ⑧ of the mechanism unit. The two screws ⑧ of the cassette tray can be removed easily by pushing the tray lock lever in the arrow direction to remove the lock as shown in the enlarge view A and by pushing the lid opener lever in the arrow direction to remove the lock as shown in the enlarge view B.
5. Lift up the whole mechanism unit and main board (CP-1 PWB assembly), and as shown in Fig. 1-1-3, push the two lock clamps (D) of the chassis in the arrow direction so that they can be removed from the chassis.

M-MP2N/G-1

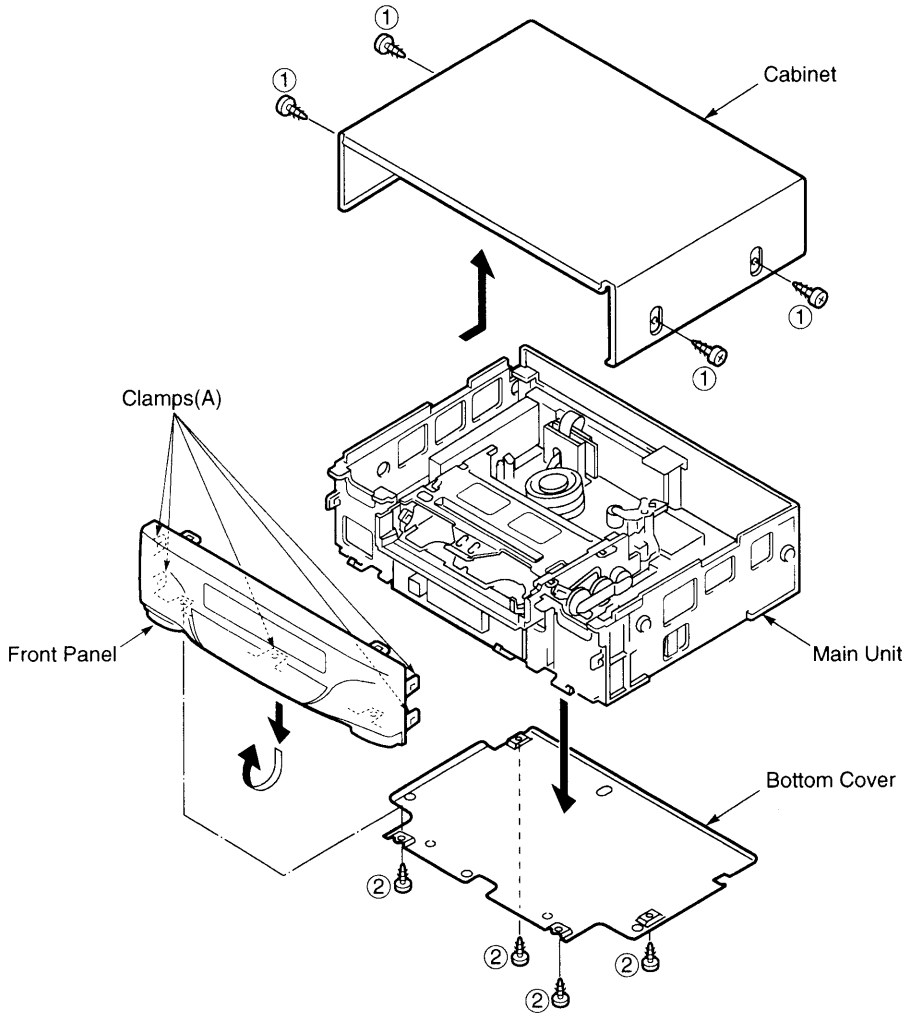


Fig. 1-1-1

M-PF2LN/TA-2

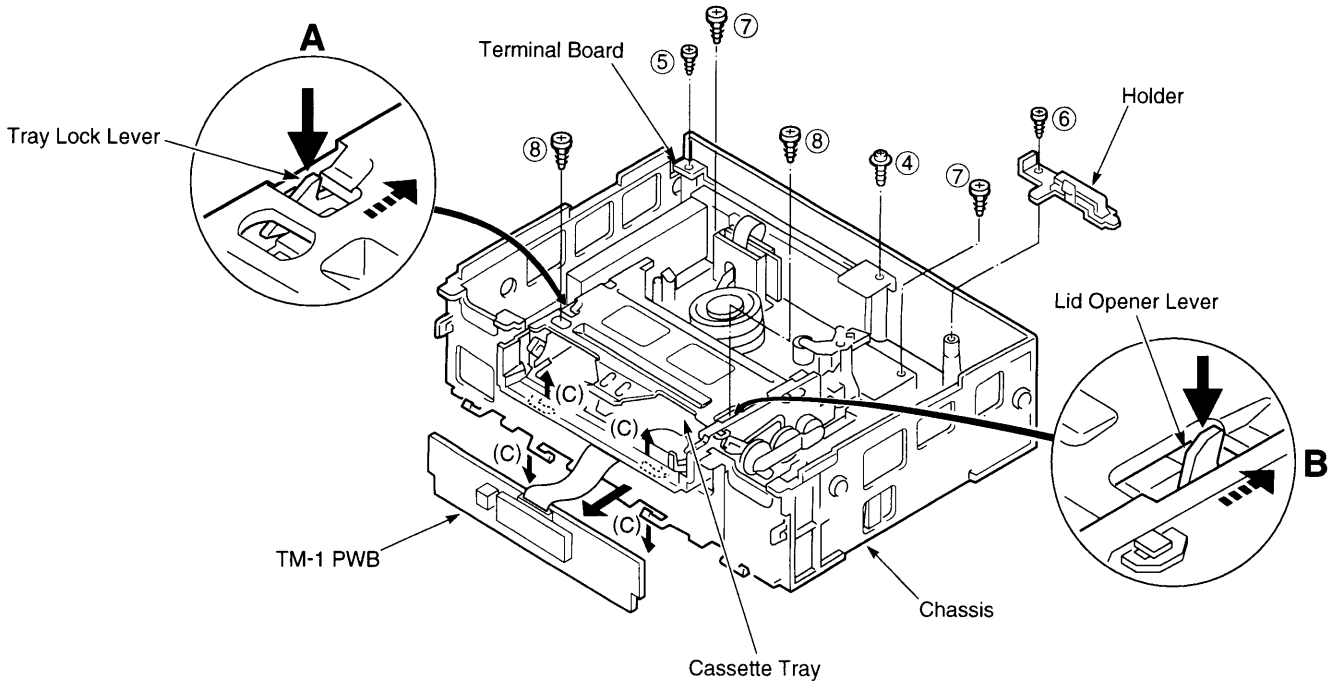


Fig. 1-1-2

M-PF2LN/TA-3

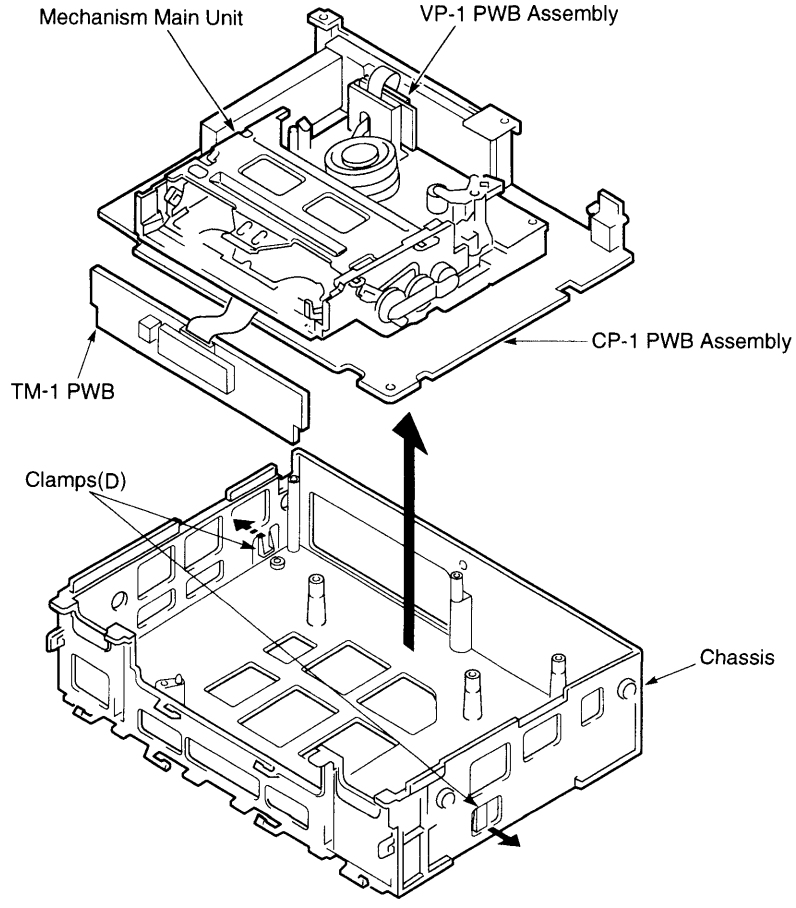


Fig. 1-1-3

1-2. TEMPORARILY SETTING UP AND CONNECTING CP-1 PWB ASSEMBLY

The following is an example of how to place and connect the main board without a jig, when repairing the CP-1 PWB assembly.

1. Place the mechanism unit and main board up side down as a whole on a flat surface with foil side of the main board facing up.
2. Operete the unit using the buttons on TM-1 PWB or the remote control.

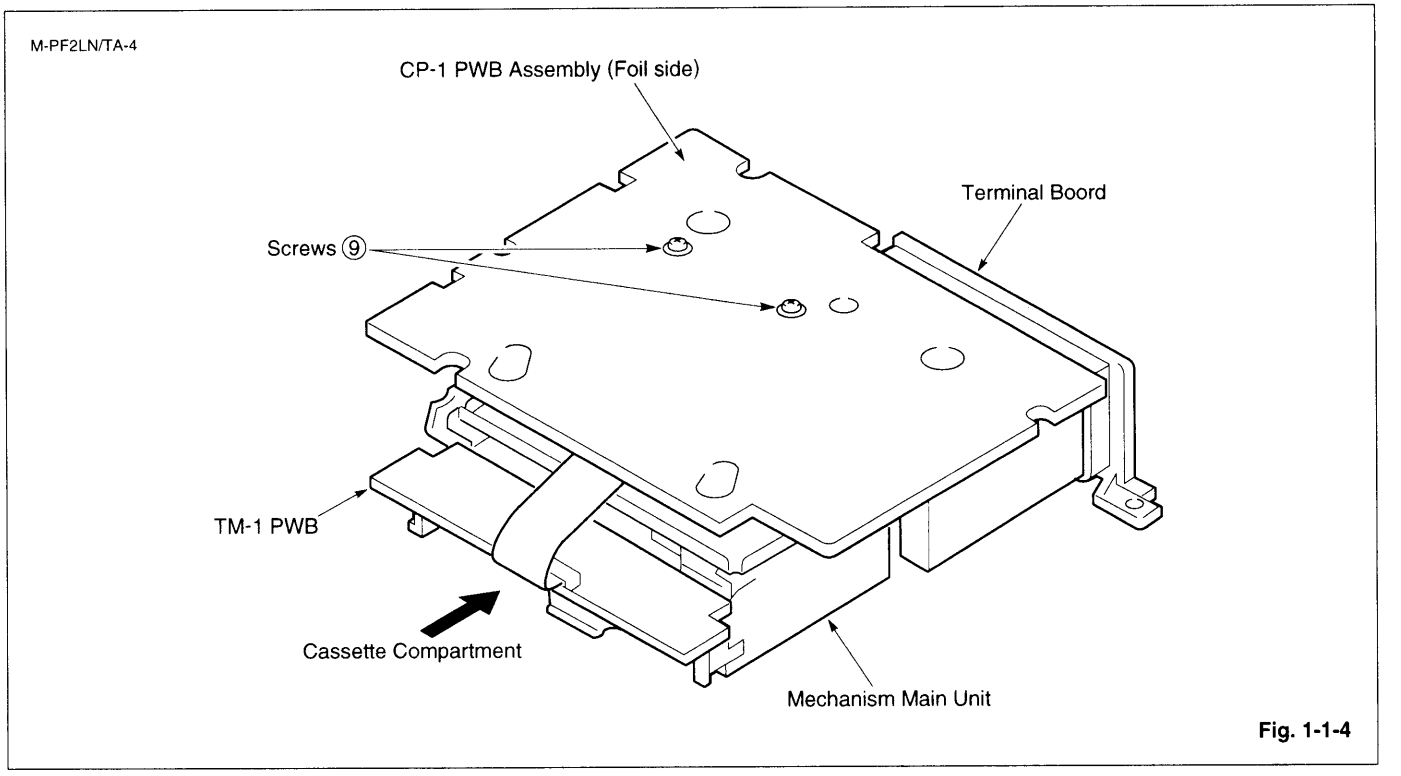


Fig. 1-1-4

1-3. INSTALLATION OF THE FRONT PANEL

When installing the front panel to the chassis after repaires and adjustments.

1. Pressing down the door opener lever of the mechanism main unit.
2. Set the cassette door to half-opened state as shown in Fig. 1-1-5, and install the front panel to the chassis.

Note: Opened cassette door position does not install the front panel to the chassis.

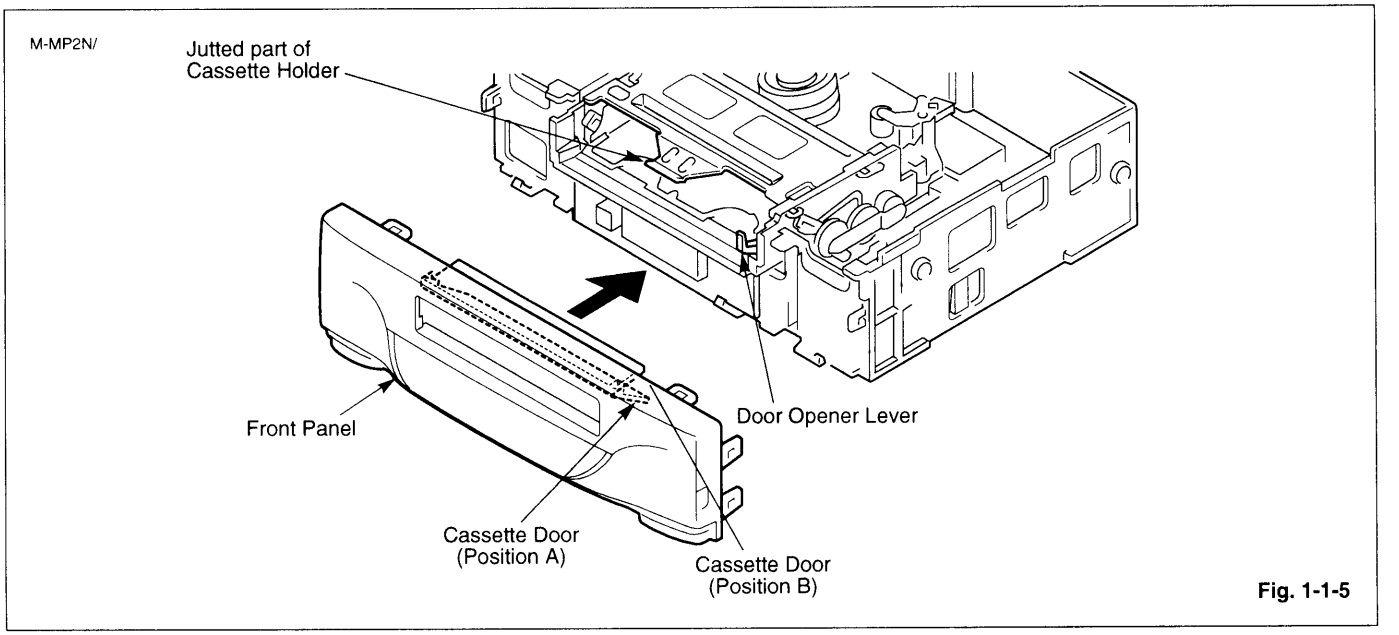
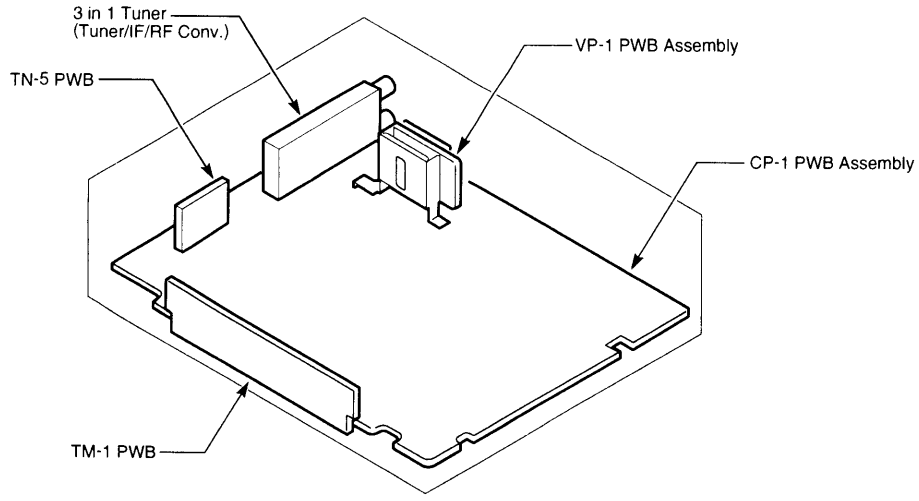


Fig. 1-1-5

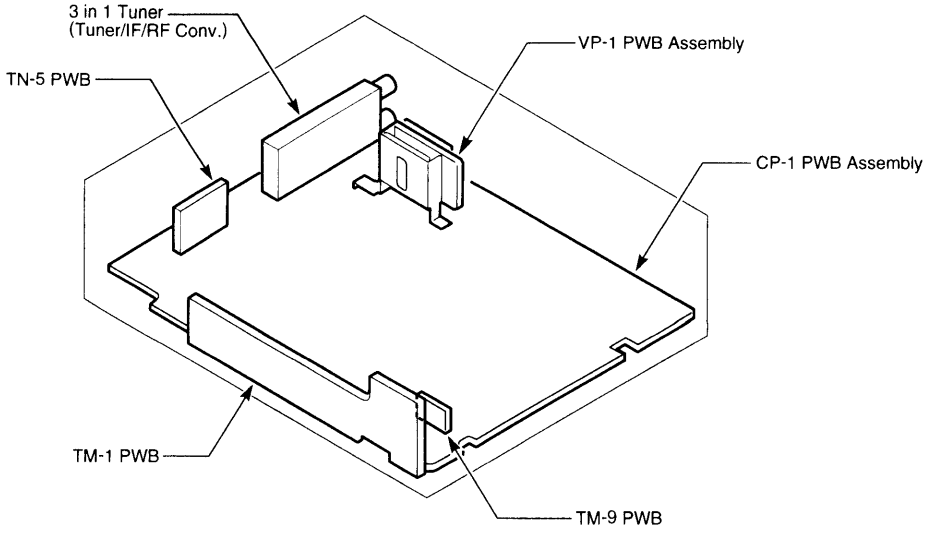
1-4. CIRCUIT BOARD LOCATIONS

L-MP2N/G

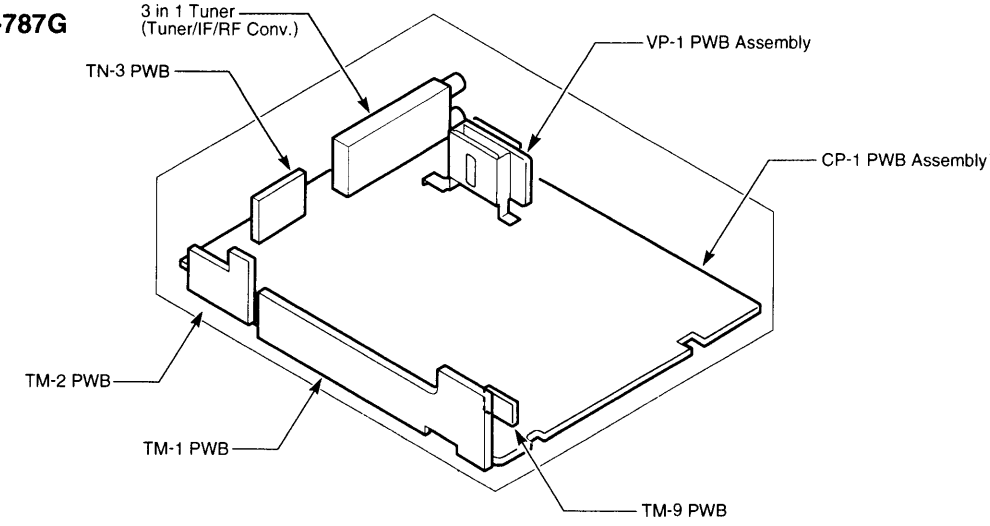
VHR-767E



VHR-777E



VHR-787G



2. ELECTRICAL ADJUSTMENT

VCR PRESETTING

This VCR need three basic presetting by using the menus displayed on-screen. After all connection have been made, then follow steps 1 to 3 to preset the VCR.
The three presetting steps will be displayed in sequence on TV screen. The setting are entered with the remote control.

Turn on the VCR

1. Adjusting the TV receiver to the video channel: The AUTO SETUP screen will appear. When the video channel has been preset, press the OK button on the remote control.
2. Country selection: Using the numeric button, select the country of use.
3. Language selection: When the desired language has been select, press the MENU/TV button directly before prevent auto tuning will start.

When steps 1 to 3 have been finish, ready to operate the all operating mode.

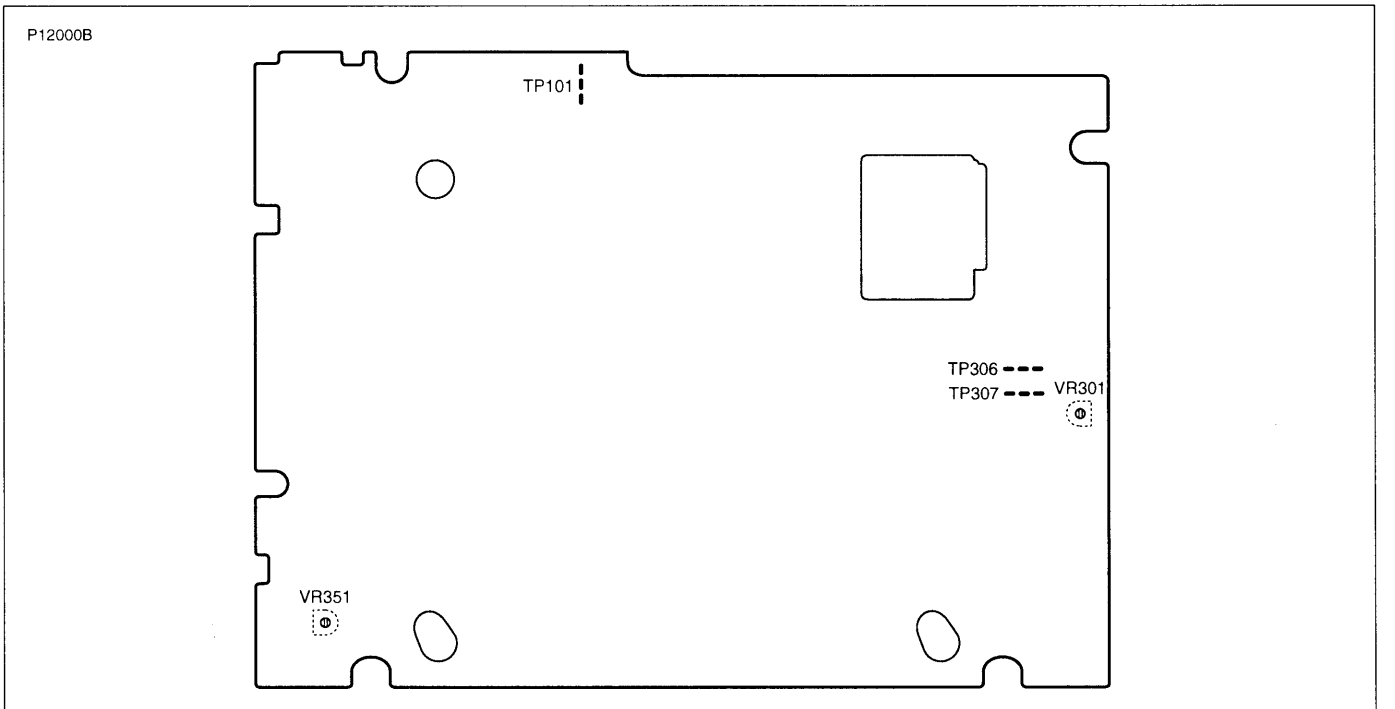
2-1. SERVO CIRCUIT ADJUSTMENT

- These adjustments should be done upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustment) are done after these adjustments, follow the procedures again in section 2-1-3, "Switching position adj."
- When a cassette tape is loaded, auto-tracking will be set immediately after starting the first playback. As this will daviate the tracking center set, be sure to press the channel buttons (+) and (−) once directly after starting playback to prevent auto-tracking from being set.

2-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Oscilloscope	Vertical sensitivity Bandwidth	: 5 mV/DIV, external trigger : more than 10 MHz
Alignment Tape	VHJ-0009 or VHJ-0023	: SP mode, monoscope, 6 KHz
Blank Tape	VHS-type cassette tape	
Monitor TV		

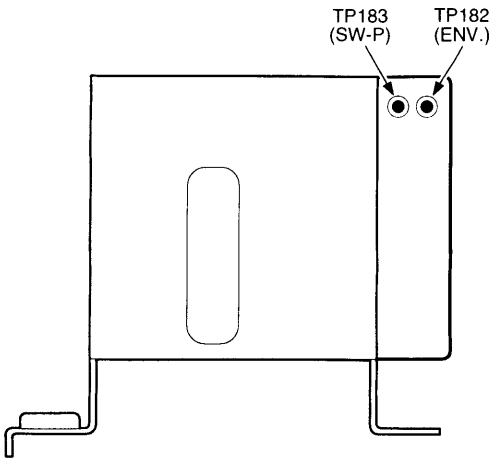
2-1-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (Foil side)

Fig. 2-1-1

P66300D



VP-1 PWB Assembly

Fig. 2-1-2

2-1-3. SWITCHING POSITION ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
TP101 (VIDEO OUT) TP183 (SW-P)	Oscilloscope	PLAY (SP) mode Alignment tape (VHJ-0009 or VHJ-0023)

Adj. Location	Adj. Value
VR351 (SW-P)	6.5 H ± 0.5 H

1. Play back the alignment tape.
2. Set the tracking control position to the center by pressing CHANNEL buttons (+) and (−) simultaneously.
3. Adjust VR351 (SW-P) so that the width of "T" becomes 6.5 H ± 0.5 H as shown in Fig. 2-1-3.

WS-SWP

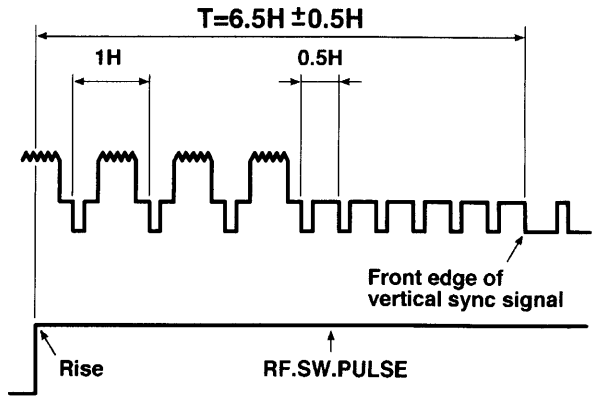


Fig. 2-1-3

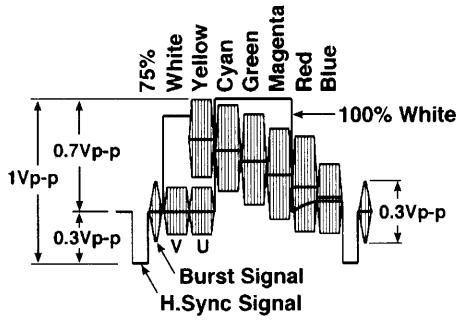
2-2. VIDEO CIRCUIT RELAY JIG

2-2-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Color Bar Signal Generator	PAL Color bar signel with 100% white level (EBU color bar signel)
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Oscilloscope Probe	Input capacity : less than 25 pF (10:1) less than 40 pF (1:1) Covering frequency : DC ~ 40 MHz (10:1) DC ~ 30 MHz (1:1)
Digital Voltmeter	DC range
Alignment Tape	VHJ-0008 or VHJ-0023 : SP mode, color bar, 1 kHz (Color bar signal waveform is described below. Refer to Fig. 2-2-1)
Relay Jig	VHJ-0067 : 12-wire flat cable for VP-1 PWB assembly

ALIGNMENT TAPE COLOR BAR SIGNAL

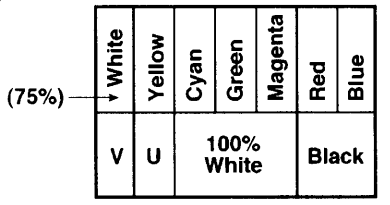
WPV-TCS



Color bar signal waveform (VHJ-0008)

Fig. 2-2-1

WPV-TCP



Color bar pattern (VHJ-0008) on monitor TV

Fig. 2-2-2

RELAY JIG

Connect the flat cable end from the cylinder assembly to the VP-1 PWB assembly using the relay jig to provide simple repairing of the VP-1 PWB assembly, as shown in Fig.2-2-3. Further, when adjusting the VP-1 PWB assembly, be sure to make contact an end of shield case with bracket of the VP-1 PWB assembly to maintain the shield effect. If the VP-1 PWB assembly does not contact, there is insufficient ground and no proper play back image can be obtained.

RJ-MP4/GSY

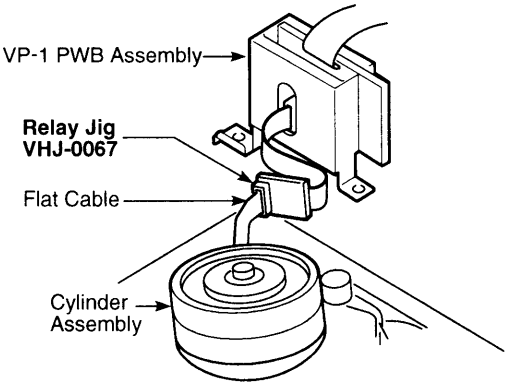


Fig. 2-2-3

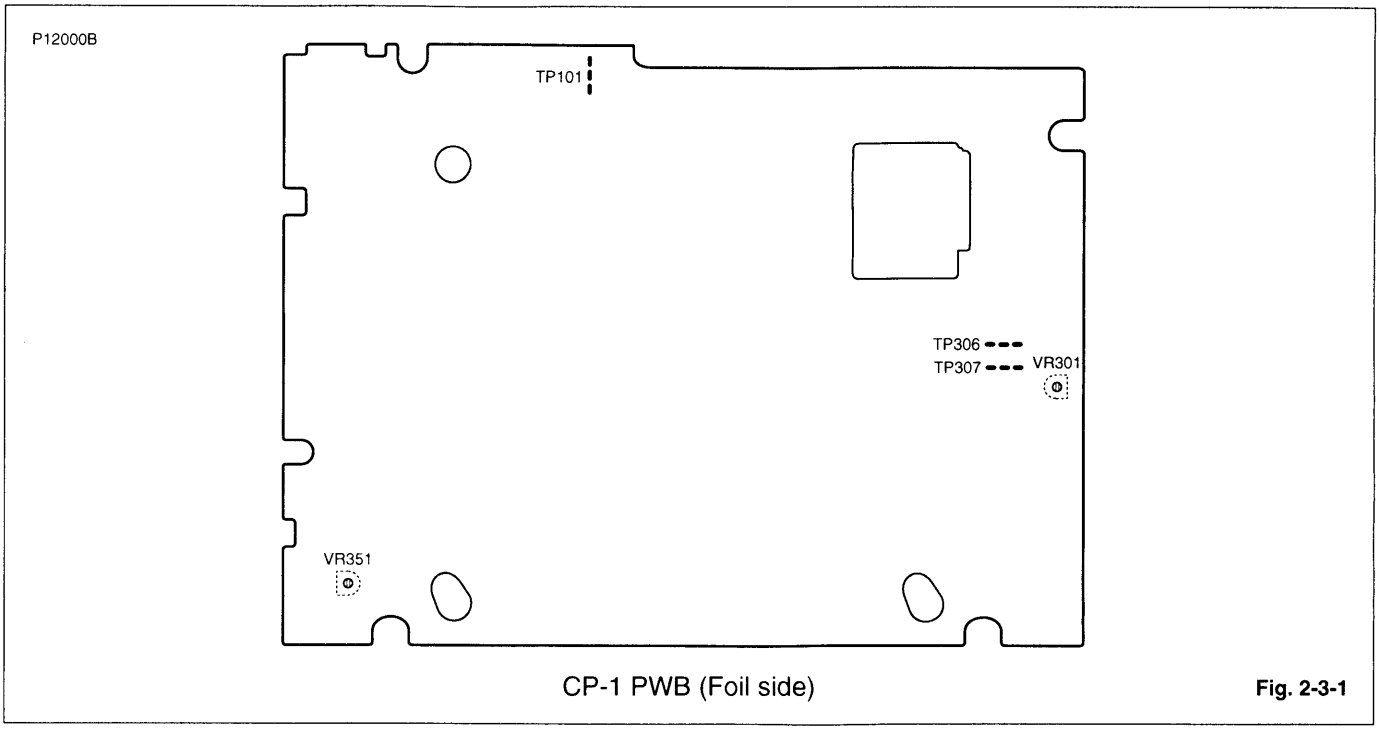
2-3. CM CUT CIRCUIT ADJUSTMENT for VHR-787G

- Before making these adjustments, be sure to make the adjustments described in section 2-1. "Servo Circuit" and "MECHANISM".

2-3-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Oscilloscope	Vertical sensitivity : 5 mV/DIV Bandwidth : more than 30 MHz
Blank Tape	VHS-type cassette tape

2-3-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (Foil side)

Fig. 2-3-1

Note:

- Set the following remote control button to the positions indicated below, before making following adjustments.

REMOTE CONTROL BUTTON	POSITION
TAPE SPEED	SP
INPUT	AV

2-3-3. DC LEVEL ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
TP306, TP307 Tuner	Oscilloscope (10:1 probe)	REC (SP) mode Blank tape

Adj. Location	Adj. Value
VR301	95 ± 5 mV

1. Input BLACK BURST signal to the VIDEO INPUT terminal. (Fig. 2-3-2)
2. Lead the VCR with a blank tape and select the REC mode.
3. Adjust VR301 so that the difference between the DC level of TP306 and the DC level of TP308 is 95 ± 5 mV.

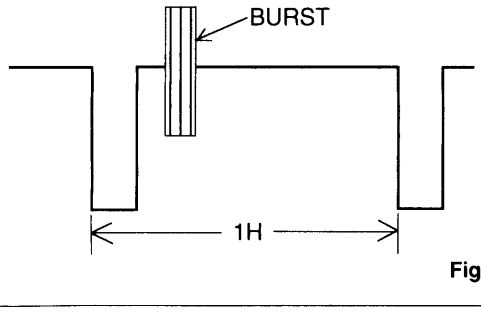


Fig. 2-3-2

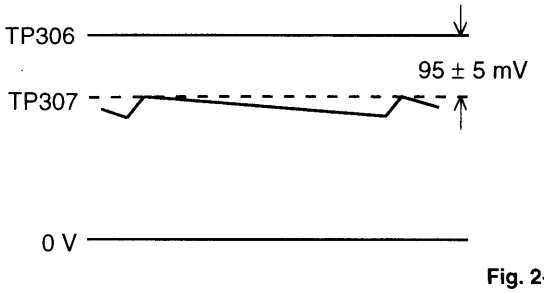


Fig. 2-3-3

2-4. MTS DECODER CIRCUIT ADJUSTMENT

- If adjusting the MTS Decoder circuit, special equipment shown in section 2-4-1. is necessary.
- Improper adjustment will cause loss of performance of stereo sound and bilingual sound detection.
- Before making these adjustments, be sure to make the adjustments described in section 2-1. " Servo Circuit.", section 2-2. "Video Circuit Relay Jig."

2-4-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Audio Multiplex TV signal Generator	
Oscilloscope	
AC Voltmeter	
Low Path Filter	15 kHz (48dB/oct)

2-4-2. LOCATION OF ADJUSTMENT POINTS

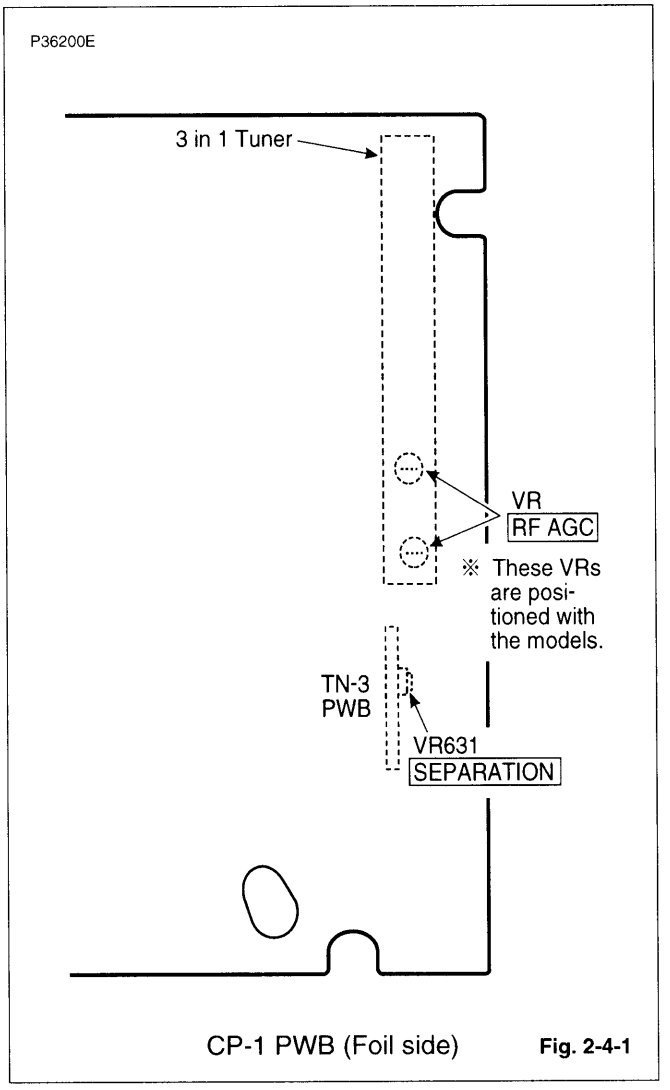


Fig. 2-4-1

Note:

- Set the following remote control button to the positions indicated below, before making following adjustments.

REMOTE CONTROL BUTTON	POSITION
TAPE SPEED	SP
INPUT	AV
AUDIO	LR

2-4-3. SEPARATION ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
AUDIO OUTPUT terminal EURO pin3 (Lch)	Audio Multiplex TV signal generator Oscilloscope Low path filter 15 kHz (48 dB/oct)	E-E mode

Adj. Location	Adj. Value
VR631 (SEPARATION)	Minimum level

1. Input the output signal of the audio multiplex TV signal generator into the VCR ANT input terminal.
2. Connect the oscilloscope to the audio output terminal EURO pin 3 (Lch) of the VCR via the LPF.
3. Set the audio multiplex TV signal generator as follows.
   Audio signal Rch: 1 kHz 30% modulation
   Audio signal Lch: Unmodulation
4. Adjust VR631 (SEPARATION) so that the output of the audio output terminal (Lch) is brought to its minimum level.

2-5. IF CIRCUIT ADJUSTMENT

- In this model, the circuits of the TUNER, IF, and RF converter have been made into one. Therefore, should one circuit malfunction, the whole unit must be replaced.
- The adjustments for the IF (RF AGC) circuit of the 3 in 1 tuner are described below.

Note: The 3 in tuner dose not need any adjustments, because precise adjustments were down before shipment.

2-5-1. TEST EQUIPMENT AND STANDARD REQUIRED

Monitor TV	

2-5-2. LOCATION OF ADJUSTMENT POINT

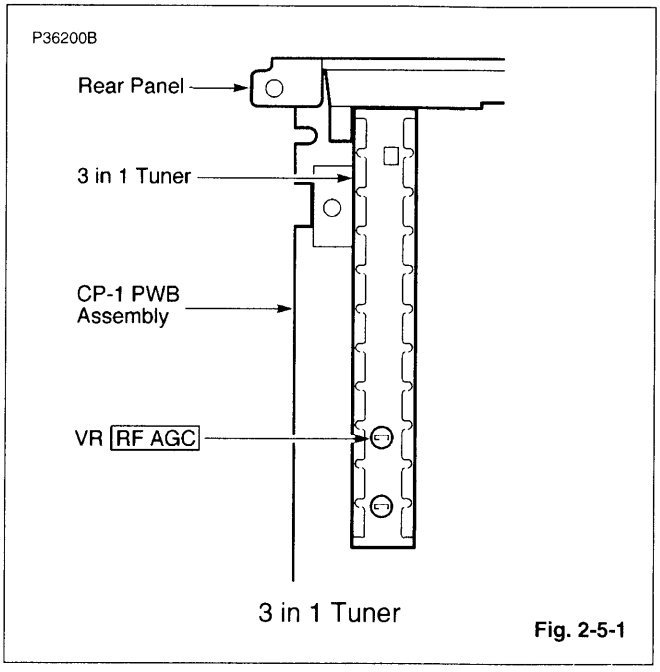


Fig. 2-5-1

2-5-3. RF AGC ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor TV	Monitor TV	E-E mode

Adj. Location	Adj. Value
VR (RF AGC) (on the 3 in 1 tuner)	S/N is best point

1. Connect the monitor TV to the VHF/UHF antenna output terminal.
2. Connect the VHF or UHF antenna to the VHF/UHF antenna input terminal.
3. Receive the middle electrical field (70 dBμ ~ 90 dBμ) of the VHF or UHF channel, and slowly turn the VR (RF AGC) from the point where snow-noise is present to the point where it just disappears from the monitor TV.
4. Confirm by monitor TV that there is no beat and saturation (S/N is best point) when receiving any TV channel.

2-6. CHECKING THE RF CHANNEL

If the TV and VCR are connected by an aerial output cable which has poor shielding characteristics, turn off the RF converter of the VCR and use the VCR with an AV cable. To turn the RF converter off, input "00" when setting the RF (when "RF" is displayed) during VCR pre-setting.

3. TEST POINTS FOR TAPE PATH ADJUSTMENT

Test points TP182 (ENV) and TP183 (SW-P) for tape path adjustment are shown in figure below.
For adjustment, refer to the separate volume "V95 I Mechanism Manual" (MM531433) and "V95 II Mechanism Manual" (MS531500).

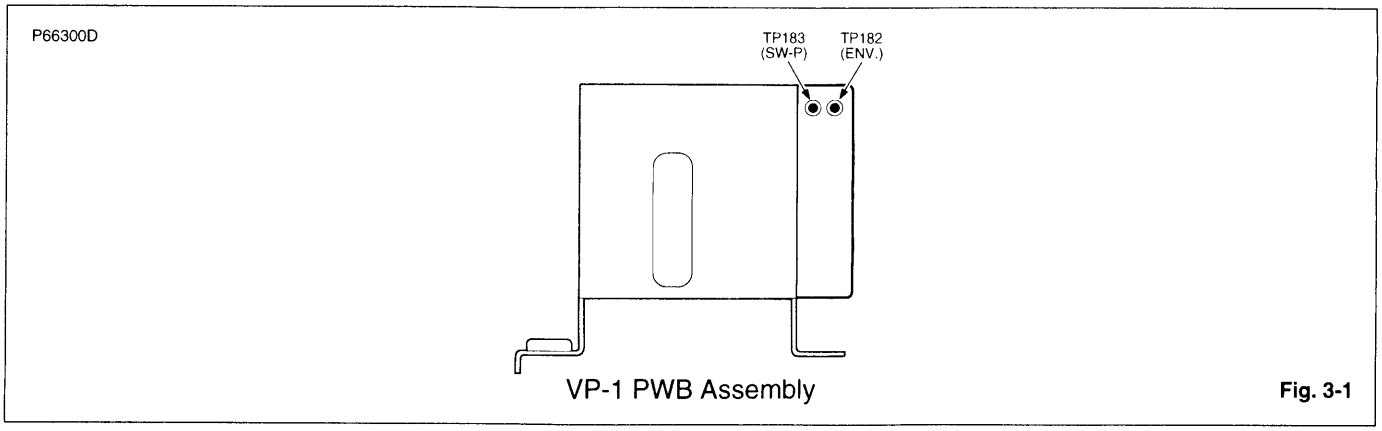


Fig. 3-1

4. PARTS LIST

ACCESSORIES

LOCATION		PARTS NO.	DESCRIPTION
		645 023 2732	REMOCON,INFRARED,WITH COVER,BATTERY, VHR-767E
OR		645 021 3465	REMOCON,INFRARED,WITH COVER,BATTERY, VHR-787G
OR		645 020 6931	REMOCON,INFRARED,WITH COVER BATTERY, VHR-777E
		613 169 4385	COVER,BATTERY,FOR REMOCON, VHR-767E ONLY
OR		613 173 7013	COVER BATTERY,FOR REMOCON, EXCEPT VHR-767E
		613 176 0257	INSTRUCTION MANUAL,VHR-767E ONLY
OR		613 174 1065	INSTRUCTION MANUAL,VHR-787G ONLY
OR		613 173 1370	INSTRUCTION MANUAL,VHR-777E ONLY
		645 009 4569	CABLE,ANT PAL
OR		645 003 1182	CABLE,ANT PAL
	⚠	645 009 0400	CORD,POWER,VHR-787G ONLY
OR	⚠	645 019 1923	CORD,POWER,EXCEPT VHR-787G
OR	⚠	645 003 3766	CORD,POWER,VHR-787G ONLY
OR	⚠	613 136 6411	CORD,POWER,EXCEPT VHR-787G
OR	⚠	645 011 4335	CORD,POWER,EXCEPT VHR-787G
OR	⚠	645 002 6805	CORD,POWER,VHR-787G ONLY
OR	⚠	645 019 2647	CORD,POWER,VHR-787G ONLY
OR	⚠	613 132 3568	CORD,POWER,VHR-787G ONLY

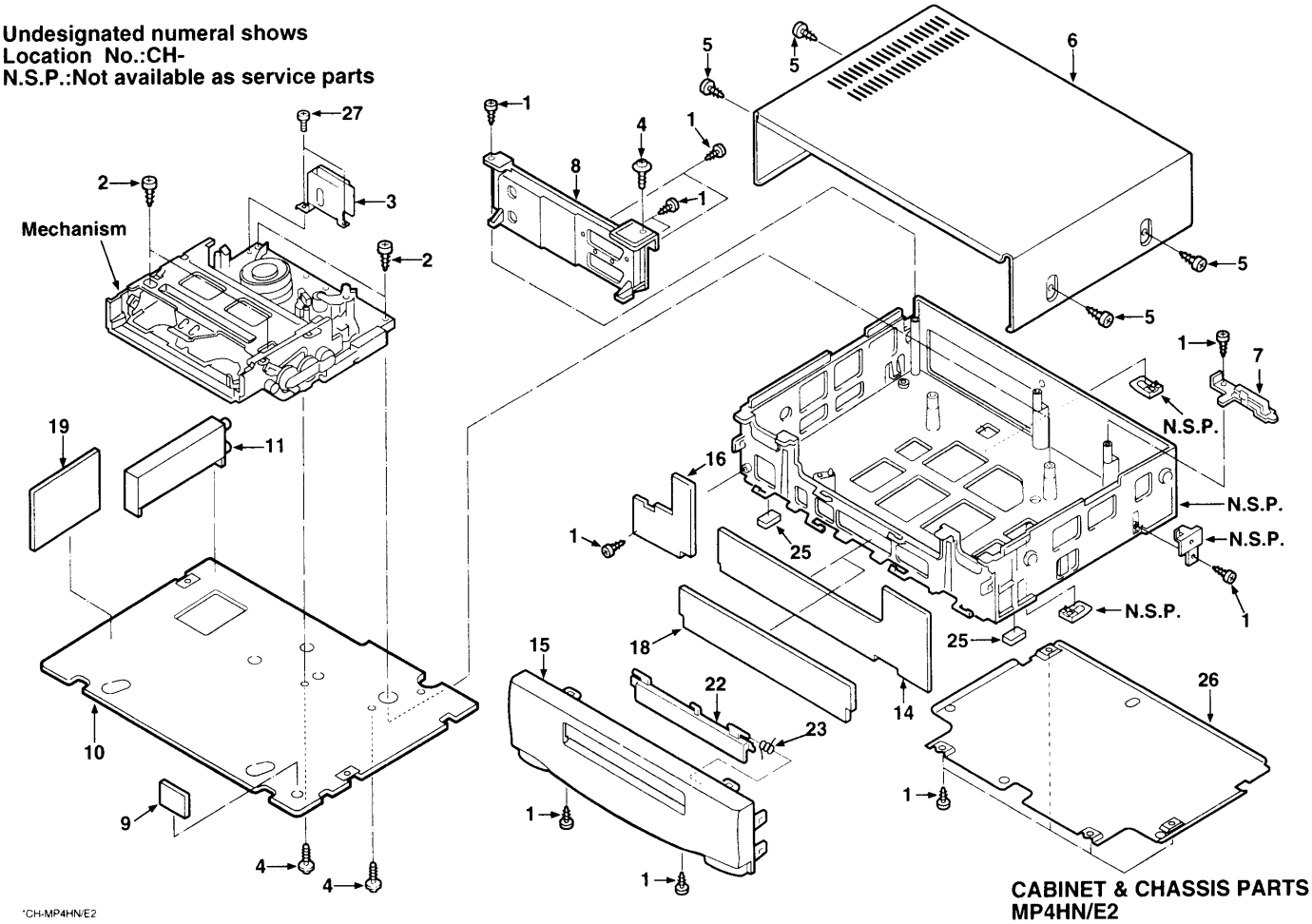
PACKING MATERIALS

	613 173 2506	CARTON CASE,VHR-777E ONLY
OR	613 176 0004	CARTON CASE,VHR-767E ONLY
OR	613 174 4004	CARTON CASE,VHR-787G ONLY
	613 173 2537	CUSHION, FRONT (SID)
	613 173 2544	CUSHION, BACK (SID)
	613 139 8047	POLYE COVER,INNER-K,EXCEPT VHR-787G
OR	613 099 1768	POLYE COVER,INNER-K,VHR-777E ONLY

CABINET & CHASSIS PARTS

LOCATION	PARTS NO.	DESCRIPTION
CH-1	411 137 0007	SCR L-TPG BIN 3X10
CH-2	411 021 7907	SCR S-TPG BIN 4X12
CH-3	613 172 9162	COMPL PWB,VP-1
CH-4	412 052 5108	SPECIAL SCREW-2.6X12
CH-5	412 028 9406	SPECIAL SCREW
CH-6	613 161 2952	COVER TOP,VHR-787G ONLY
OR	613 163 4794	COVER TOP,VHR-777E ONLY
OR	613 160 6036	COVER TOP,VHR-767E ONLY
CH-7	613 160 2885	HOLDER
CH-8	613 173 3244	TERMINAL,EXCEPT VHR-767E
OR	613 173 5620	TERMINAL,VHR-767E ONLY
CH-9	613 158 5751	COMPL PCB,TM-9,EXCEPT VHR-767E
CH-10	613 174 3069	COMPL PWB,CP-1-A,VHR-787G ONLY
OR	613 175 8520	COMPL PWB,CP-1-A,VHR-767E ONLY
OR	613 173 1752	COMPL PWB,CP-1-A,VHR-777E ONLY
CH-11	645 019 0070	TUNER,RF/TU/IF,VHR-787G ONLY
OR	645 019 0117	TUNER,RF/TU/IF,EXCEPT VHR-787G
CH-14	613 174 1409	COMPL PWB,TM-1,VHR-787G ONLY
OR	613 173 0458	COMPL PWB,TM-1,VHR-777E ONLY
CH-15	613 176 7270	ASSY,CABINET FRONT,VHR-777E ONLY
OR	613 174 3793	ASSY,CABINET FRONT,VHR-787G ONLY
OR	613 175 9862	ASSY,CABINET FRONT,VHR-767E ONLY
CH-16	613 174 1393	COMPL PWB,TM-2,VHR-787G ONLY
CH-18	613 173 9192	COMPL PWB,TM-1,VHR-767E ONLY
CH-19	613 173 4470	COMPL PWB,TN-3,VHR-787G ONLY
OR	613 161 6226	COMPL PWB,TN-5,EXCEPT VHR-787G
CH-22	613 174 3922	DOOR CASSETTE,VHR-787G ONLY
OR	613 173 2377	DOOR CASSETTE,VHR-777E ONLY
OR	613 175 9923	DOOR CASSETTE,VHR-767E ONLY
CH-23	613 153 0478	SPRING
CH-25	613 121 1001	STAND,FELT(FRONT)
CH-26	613 160 5091	COVER BOTTOM
CH-27	411 001 1901	SCR S-TPG BIN 3X6

Undesignated numeral shows Location No.:CH-
N.S.P.:Not available as service parts



*CH-MP4HN/E2

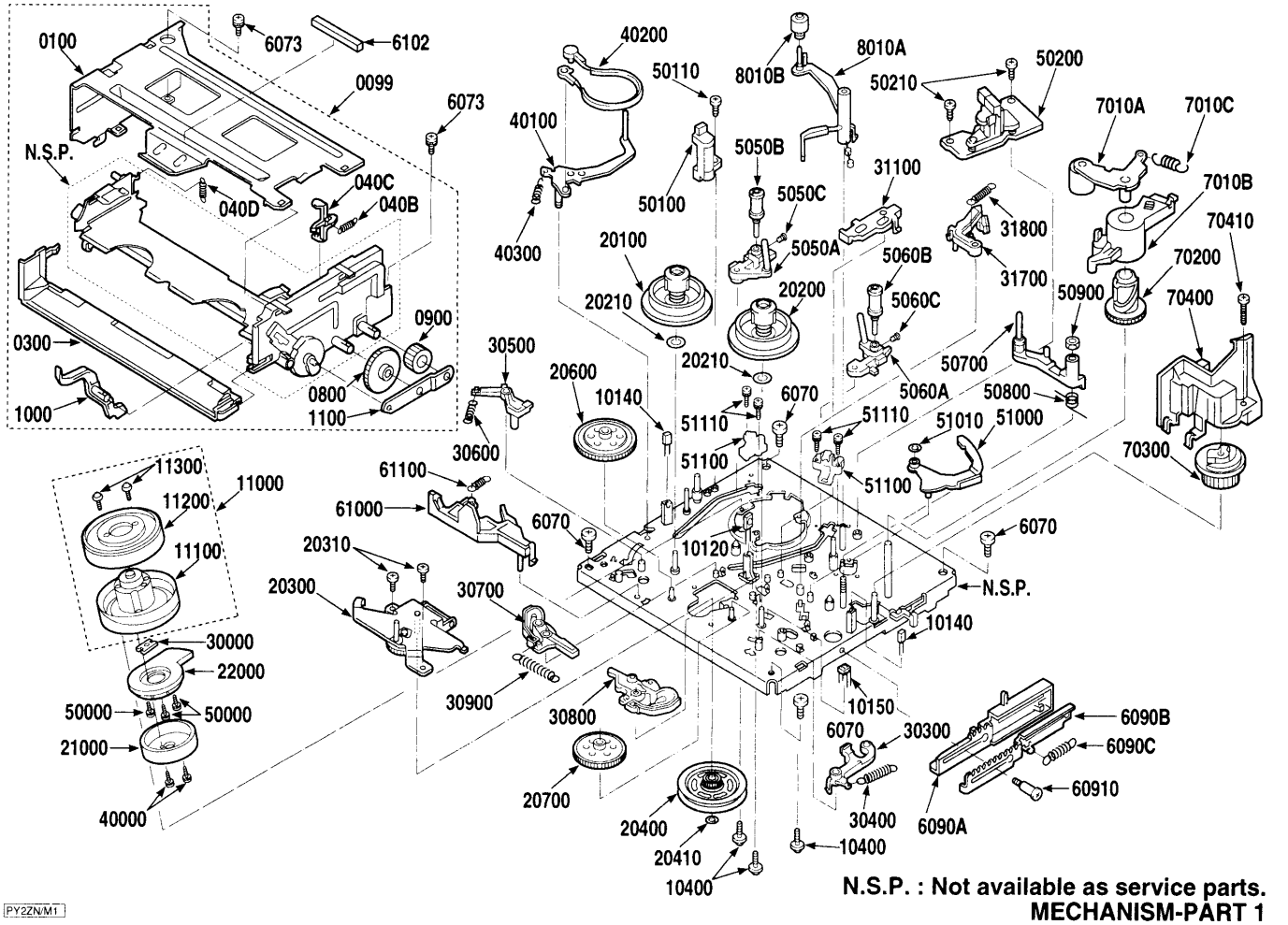
CABINET & CHASSIS PARTS MP4HN/E2

MECHANISM PARTS

Note: For Location numbers 8010A and 8010B, parts marked (#C) and (#D) in DESCRIPTION are not interchangeable with each other.
However, these are interchangeable when 8010A and 8010B are in the assembled state.
(#C) and (#D) can be differentiated from the color and height of the roller (8010B).
(#C) is gray and toll and (#D) is black and short.

MECHANISM PARTS 1

LOCATION	PARTS NO.	DESCRIPTION
11000	613 164 5981	COMPL,CYLINDER,4H6P-R2
11100	613 096 2751	ASSY,CYLINDER,LWR 6K
11200	613 164 6001	ASSY,CYLINDER,UPR 4H6P-R2
11300	411 038 1608	SCR PAN+W 3X8
21000	645 015 7875	MOTOR,ROTOR,CYL DC 2W
22000	645 015 7868	MOTOR,STATOR,CYL DC 2W
30000	613 097 2170	SPACER,MOTOR
40000	412 036 5001	SPECIAL SCREW 2.3X6
50000	412 036 4905	SPECIAL SCREW 2.3X10
0099	613 152 0578	COMPL,CASSETTE MECHANISM
0100	613 152 0738	STAND,L
0300	613 152 0660	FRAME,UNDER
0800	613 152 2794	GEAR,LOCK
0900	613 152 2800	GEAR,PINION
1000	613 151 9480	LEVER,DOOR OPENER
1100	613 151 9299	HOLDER,GEAR
040B	613 152 0417	SPRING,LID OPENER
040C	613 152 0707	LEVER,RELEASE
040D	613 152 0424	SPRING,TRAY LOCK
6073	412 048 8205	SPECIAL SCREW-2.6X6
6102	613 151 6618	PAD
6070	411 021 7907	SCR S-TPG BIN 4X12
10120	407 162 1102	LED LN59L
10140	407 162 8705	PHOTO DIODE PN263L-(NC)
10150	407 165 8108	PHOTO COUPLE SG-105F
OR	407 043 0101	PHOTO DIODE ON2170-R
10400	412 052 6204	SPECIAL SCREW-2.6X5.5
20100	613 169 0974	REEL,SUPPLY
OR	613 160 5503	ASSY,REEL SUPPLY
20200	613 160 4193	ASSY,REEL TAKE UP
20200	613 168 1514	ASSY,REEL TAKE UP
20210	412 015 8900	SPECIAL WASHER 3.1X6X0.4
OR	412 015 8504	SPECIAL WASHER 3.1X6X0.5
OR	412 021 5306	SPECIAL WASHER 3.1X6X0.3
20300	613 175 0661	COMPL,MOUNTING CLUTCH
OR	613 171 6896	COMPL,MOUNTING CLUTCH
20310	412 048 7505	SPECIAL SCREW-2.6X4
20400	613 151 9701	PULLEY,REEL
20410	412 045 4606	SPECIAL WASHER 2.4X6X0.25
20600	613 152 2749	GEAR,REEL S
20700	613 152 2756	GEAR,REEL T
30300	613 160 3356	ASSY,BRAKE SOFT T
30400	613 152 0295	SPRING,SOFT T
30500	613 151 9411	LEVER,SOFT S
30600	613 152 0318	SPRING,SOFT S
30700	613 160 6166	ASSY,BRAKE,S
30800	613 159 2193	ASSY,BRAKE T
30900	613 163 6996	SPRING,BRAKE
31100	613 152 0189	SLIDE,ACT BRAKE T
31700	613 151 8490	ASSY,BRAKE CAPSTAN
31800	613 152 0356	SPRING,BRAKE CAPSTAN
40100	613 151 8759	ASSY,LEVER,BT
40200	613 160 5282	ASSY,BRAKE,BAND
40300	613 152 0271	SPRING,BT
50100	645 017 6432	HEAD,ERASE FULL
50110	412 048 9707	SPECIAL SCREW-2.6X10
50200	613 176 8406	ASSY,HEAD R/P ACE
50210	412 052 3500	SPECIAL SCREW 2.6X12
5050A	613 164 7237	ASSY,MOUNTING,INCLINE S
5050B	613 022 0233	ASSY,GUIDE,ROLLER
5050C	412 048 4504	SPECIAL SCREW-2X3



N.S.P. : Not available as service parts.

MECHANISM-PART 1

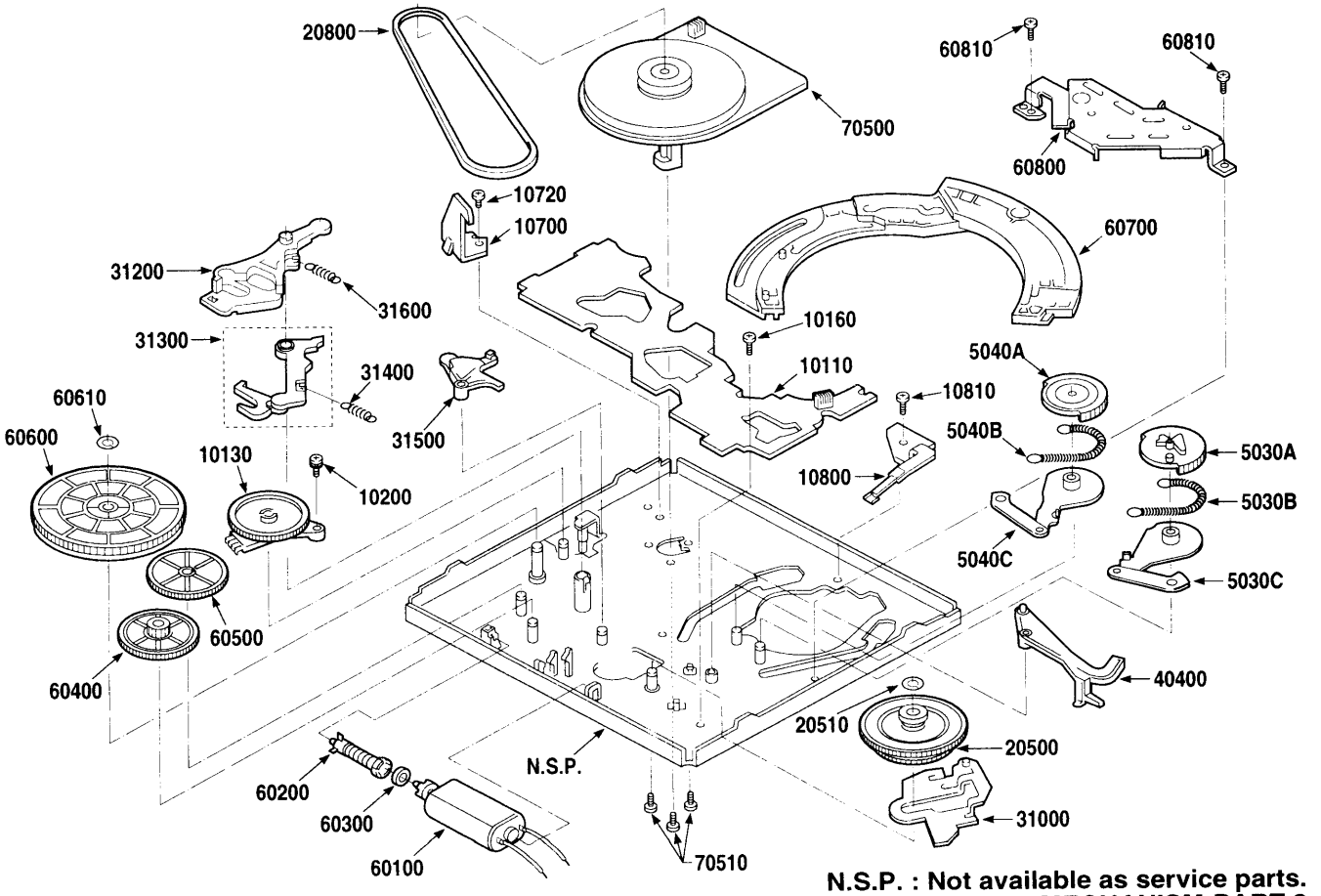
PY2ZN/M1

LOCATION	PARTS NO.	DESCRIPTION
5060A	613 164 7251	ASSY,MOUNTING,INCLINE T
5060B	613 022 0233	ASSY,GUIDE,ROLLER
5060C	412 048 4504	SPECIAL SCREW-2X3
50700	613 164 4762	ASSY,LEVER,LOAD
50800	613 152 0387	SPRING,LEVER L GUIDE
50900	412 048 8908	SPECIAL NUT-3X3
51000	613 173 6153	ASSY,LEVER,ACT L GUIDE
OR	613 161 2365	ASSY,LEVER,ACT L GUIDE
51010	412 033 4106	WASHER SLIT 2.6X5X0.50
51100	613 160 7057	MOUNTING,CATCHER
51110	412 049 1700	SPECIAL SCREW-2.6X10
6090A	613 151 9152	GEAR,RACK FRONT
OR	613 160 4636	GEAR,RACK FRONT
6090B	613 151 9114	GEAR,RACK START
6090C	613 152 0226	SPRING,RACK FRONT
60910	412 050 2802	SPECIAL SCREW-2.6X6
61000	613 151 9398	LEVER,EP SW
61100	613 152 3692	SPRING,EP SW
7010A	613 151 8803	ASSY,LEVER,PINCH ROLLER
7010B	613 171 0221	MOUNTING,LIFT PINCH
7010C	613 152 0233	SPRING,PINCH ROLLER
70200	613 156 3841	CAM,LIFT PINCH
70300	613 152 0677	GEAR,CAM PINCH
70400	613 152 0714	MOUNTING,OPENER
70410	412 049 1106	SPECIAL SCREW-2.6X16
8010A	613 159 7273	LEVER,CLEANER,VHR-787G ONLY (#C)
OR	613 171 9606	LEVER,CLEANER,VHR-787G ONLY (#D)
8010B	613 158 5829	ASSY,ROLLER CLEANER,VHR-787G ONLY (#C)
OR	613 171 9439	ASSY,MOUNTING CLEANER, VHR-787G ONLY (#D)

MECHANISM PARTS 2

10110	613 173 9451	COMPL PWB,MC-1
10130	645 007 1560	SWITCH,MODE

LOCATION	PARTS NO.	DESCRIPTION
10160	412 048 7505	SPECIAL SCREW-2.6X4
10200	412 048 8304	SPECIAL SCREW-2.6X8
10700	613 167 5926	MOUNTING CAPSTAN
10720	412 048 8007	SPECIAL SCREW-2.6X6
10800	613 165 8523	ASSY,EARTH CYL
OR	613 160 4179	ASSY,EARTH CYL
10810	412 048 8007	SPECIAL SCREW-2.6X6
20500	613 160 4186	ASSY,GEAR,FRICTION
20510	411 109 1605	WASHER Y 2.6X6X0.25
20800	613 151 9039	BELT,REEL
31000	613 152 0165	SLIDE,ACT BRAKE S
31200	613 159 0991	LEVER,CONTROL BRAKE
31300	613 159 0847	COMPL,LEVER,ACT BRAKE
31400	613 152 0332	SPRING,RETURN BRAKE
31500	613 151 9459	LEVER,CHANGE CLUTCH
31600	613 152 0349	SPRING,CHANGE CLUTCH
40400	613 153 7583	ASSY,LEVER SPRING BT
5030A	613 152 2763	GEAR,LOAD S
5030B	613 152 0370	SPRING,LOAD S
5030C	613 160 3691	ASSY,LEVER,LOAD S
5040A	613 152 2770	GEAR,LOAD T
5040B	613 152 0363	SPRING,LOAD T
5040C	613 160 3707	ASSY,LEVER,LOAD T
60100	645 003 4305	ASSY,MOTOR LOADING
60200	613 151 8599	COMPL,GEAR,WORM
60300	613 151 9107	DAMPER
60400	613 151 9138	GEAR,WHEEL 1
60500	613 160 3790	GEAR,WHEEL 2
60600	613 156 4008	CAM,MAIN
60610	412 054 6806	SPECIAL WASHER 3.6X0.5
60700	613 159 9017	SLIDE,CRESCENT
60800	613 159 8997	MOUNTING,CRESCENT
60810	412 048 8007	SPECIAL SCREW-2.6X6
70500	645 008 1880	MOTOR,CAPSTAN DC 3W
70510	412 048 7604	SPECIAL SCREW-2.6X6



N.S.P. : Not available as service parts.

MECHANISM-PART 2

MA4/U4-M2

ELECTRICAL PARTS

Note:

1. Materials of Capacitors and Resistors are abbreviated as follows ;

Resistors		Capacitors	
MT-FILM	Metallized Film Resistor	MT-POLYEST	Metallized Polyester Capacitor
MT-GLAZE	Metallized Glaze Resistor	MT-COMPO	Metallized Composite Capacitor
OXIDE-MT	Oxide Metallized Film Resistor	TA-SOLD	Tantalum Solid Capacitor
		AL-SOLID	Aluminum Solid Capacitor
		NP-ELECT	Non-Polarized Electrolytic Capacitor
		OS-SOLID	Aluminum Solid Capacitors with Organic Semiconductive Electrolytic Capacitor
		DL-ELECT	Double Layered Electrolytic Capacitor

2. Tolerance of Capacitor (10pF over) and Resistor are noted with follow symboles.
   F .....1% G .....2% J .....5% K 10%
   M .....20% N .....30% Z .....+80% ~ -20%
3. Capacitors
   U : μF P : pF
4. Inductors
   UH : μH MH : mH
5. N.S.P. : Not available as service parts.

LOCATION	PARTS NO.	DESCRIPTION
COMPL PWB,CP-1-A		
	613 174 3069 (VHR-787G ONLY)	
OR	613 175 8520 (VHR-767E ONLY)	
OR	613 173 1752 (VHR-777E ONLY)	
	(SEMICONDUCTORS)	
Q1002	405 035 6100	TR 2SC2413K-Q
Q1004	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q1005	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q1007	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q1101	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q1102	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q1301	405 006 1806	TR 2SA933S-R
Q1304	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q1402	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q2021	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0200	TR 2SC3331-U
Q2022	405 025 0200	TR 2SD734-G
OR	405 024 9907	TR 2SD734-F
Q2023	405 003 5609	TR 2SA1318-S
OR	405 003 5708	TR 2SA1318-T
OR	405 003 5807	TR 2SA1318-U
Q2024	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0200	TR 2SC3331-U
Q2025	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0200	TR 2SC3331-U
Q2031	405 029 3504	TR DTC144EK
Q2302	405 006 6702	TR 2SA984-F
OR	405 006 7204	TR 2SA984K-F
Q2341	405 064 0100	TR 2SA1561-Q
OR	405 064 0209	TR 2SA1561-R
OR	405 123 6708	TR 2SB1320A-Q
OR	405 123 6807	TR 2SB1320A-R
Q2342	405 015 8407	TR 2SC2812-L5
OR	405 015 8704	TR 2SC2812-L6
OR	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q3301	405 000 5305	TR DTC143TK,EXCEPT VHR-787G
Q3302	405 000 2007	TR DTA144EK,EXCEPT VHR-787G
Q3401	405 084 8209	TR 2SC2960-F-SPA,EXCEPT VHR-787G
OR	405 084 8308	TR 2SC2960-G-SPA,EXCEPT VHR-787G
Q3504	405 029 3504	TR DTC144EK
Q3551	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q3552	405 014 4509	TR 2SC2412K-R
Q3552	405 014 4608	TR 2SC2412K-S
Q3553	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q3554	405 029 3504	TR DTC144EK
Q5001	405 126 0208	TR 2SK1460LS
Q5002	405 013 7006	TR 2SC2274-F
OR	405 013 7303	TR 2SC2274K-F
Q5003	405 006 6702	TR 2SA984-F
OR	405 006 7204	TR 2SA984K-F
Q5004	405 013 7006	TR 2SC2274-F
OR	405 013 7303	TR 2SC2274K-F
Q5101	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5102	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5103	405 013 6801	TR 2SC2274-E
OR	405 013 7006	TR 2SC2274-F
OR	405 013 7204	TR 2SC2274K-E
OR	405 013 7303	TR 2SC2274K-F
Q5104	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5105	405 099 8508	TR 2SC4640S
OR	405 011 8401	TR 2SC1740S-Q
OR	405 093 0607	TR KSC2785-Y
OR	405 099 8607	TR 2SC4640T
OR	405 011 8500	TR 2SC1740S-R
Q5131	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5132	405 000 0409	TR DTA114EK
Q5133	405 000 2908	TR DTC114EK
Q5134	405 099 8508	TR 2SC4640S
OR	405 011 8401	TR 2SC1740S-Q
OR	405 093 0607	TR KSC2785-Y
OR	405 099 8607	TR 2SC4640T
OR	405 011 8500	TR 2SC1740S-R
	(INTEGRATED CIRCUITS)	
IC101	410 273 1909	IC LA71511ML-MPB
IC102	409 372 4508	IC LC89977M
IC141	410 225 2701	IC LC74783M-9083-TRM
OR	410 228 1404	IC LC74783M-9095-TRM
IC231	409 392 2201	IC BH7801AK
IC301	410 288 0409	IC LC866852A-5E48,EXCEPT VHR-787G
OR	410 282 7800	IC LC866852A-5D93,VHR-787G ONLY
IC302	409 314 2005	IC LB1643
IC303	409 313 0903	IC MN1381-L
OR	409 243 4101	IC MN1380-L
IC304	410 177 3603	IC AT24C02-10PC,EXCEPT VHR-787G
OR	409 401 6305	IC BR24C02,EXCEPT VHR-787G
OR	410 177 3702	IC AT24C04-10PC,VHR-787G ONLY
OR	409 348 6802	IC XL24C02P,EXCEPT VHR-787G
OR	409 348 6901	IC XL24C04P,VHR-787G ONLY
OR	410 172 6807	IC X24C02PC7189,EXCEPT VHR-787G
OR	410 172 6906	IC X24C04PC7346,VHR-787G ONLY
OR	410 189 5701	IC 24LC02B/P,EXCEPT VHR-787G
OR	410 189 5800	IC 24LC04B/P,VHR-787G ONLY
IC341	409 026 8203	IC L5631,EXCEPT VHR-787G

LOCATION	PARTS NO.	DESCRIPTION
IC341	409 057 5103	IC UPC574J,EXCEPT VHR-787G
IC351	409 398 5008	IC BU2896AK
IC511	409 180 2307	IC UPC1093J
	(DIODES)	
D1005	407 012 4406	DIODE 1SS133
D1301	407 012 4406	DIODE 1SS133
D1302	407 012 4406	DIODE 1SS133
D1341	407 012 4406	DIODE 1SS133
D1342	407 012 4406	DIODE 1SS133
D1347	407 012 4406	DIODE 1SS133,EXCEPT VHR-767E
D1348	407 012 4406	DIODE 1SS133,EXCEPT VHR-767E
D2301	407 012 4406	DIODE 1SS133
D2341	407 012 4406	DIODE 1SS133
D2371	407 099 7000	ZENER DIODE MTZJ15B
D2373	407 099 7000	ZENER DIODE MTZJ15B,EXCEPT VHR-767E
D3001	407 012 4406	DIODE 1SS133
D3102	407 012 4406	DIODE 1SS133
D3105	407 012 4406	DIODE 1SS133
D3106	407 012 4406	DIODE 1SS133,EXCEPT VHR-767E
D3115	407 012 4406	DIODE 1SS133,EXCEPT VHR-767E
D3116	407 012 4406	DIODE 1SS133,EXCEPT VHR-767E
D3117	407 012 4406	DIODE 1SS133
D3120	407 012 4406	DIODE 1SS133
D3124	407 012 4406	DIODE 1SS133
D3401	407 100 0006	ZENER DIODE MTZJ33C,VHR-787G ONLY
D3502	407 012 4406	DIODE 1SS133
D3505	407 100 6602	DIODE 1SS291
D3506	407 100 6602	DIODE 1SS291
D3554	407 012 4406	DIODE 1SS133
D5001	407 197 6509	DIODE DB155G-S
OR	407 104 5304	DIODE S1WB(A)60
D5003	407 078 2705	DIODE 1SS244
D5004	407 078 2705	DIODE 1SS244
D5006	407 078 2705	DIODE 1SS244
D5010	407 091 6704	DIODE AP01C
D5013 ⚠	407 169 5608	PHOTO COUPLE PC123U2
D5101	407 169 5707	DIODE RL2Z-LF-C4
OR	407 198 2609	DIODE SF34
OR	407 160 9308	DIODE ERB93-02L3
D5102	407 198 2500	DIODE SF24
OR	407 160 9308	DIODE ERB93-02L3
D5103	407 078 2705	DIODE 1SS244
D5104	407 078 2705	DIODE 1SS244
D5105	407 198 2401	DIODE SFT14
OR	407 100 6909	DIODE AG01
D5107	407 063 8903	ZENER DIODE MTZJ5.6C
D5108	407 063 8903	ZENER DIODE MTZJ5.6C
D5109	407 063 8903	ZENER DIODE MTZJ5.6C
D5110	407 099 6607	ZENER DIODE MTZJ12B
D5111	407 099 5501	ZENER DIODE MTZJ6.2C
D5112	407 004 9709	DIODE DSK10C
OR	407 005 8701	DIODE ERA15-02
D5113	407 004 9709	DIODE DSK10C
OR	407 005 8701	DIODE ERA15-02
	(CRYSTAL DEVICES)	
X1001	645 000 6012	OSC,CRYSTAL 4.433619MHZ
OR	645 000 6029	OSC,CRYSTAL 4.433619MHZ
OR	645 002 4436	OSC,CRYSTAL 4.433619MHZ
OR	645 014 8378	OSC,CRYSTAL 4.433619MHZ
X3001	645 008 8360	OSC,CERAMIC 8.500MHZ
OR	645 007 8460	OSC,CERAMIC 8.500MHZ
X3002	613 109 0972	OSC,CRYSTAL 32KHZ
OR	645 004 1938	OSC,CRYSTAL 32.768KHZ
	(VARIABLE RESISTORS)	
VR351	645 003 5166	VR,SEMI,220K N
OR	645 006 5538	VR,SEMI,220K N
OR	645 003 5593	VR,SEMI,220K N
	(INDUCTORS)	
L1002	645 001 4611	INDUCTOR 120U J
OR	645 003 7948	INDUCTOR,120U J
L1003	645 002 1510	INDUCTOR 68U J
OR	645 003 8228	INDUCTOR,68U J
L1006	645 001 4642	INDUCTOR 22U J
OR	645 003 8013	INDUCTOR,22U J
L1007	645 002 1411	INDUCTOR 10U J
OR	645 003 7894	INDUCTOR,10U J
L1101	645 008 7400	CORE,BEAD
L1102	645 009 3791	CORE,BEAD

LOCATION	PARTS NO.	DESCRIPTION
L1401	645 001 5472	INDUCTOR 33U J
OR	645 003 8105	INDUCTOR,33U J
L1402	645 002 1497	INDUCTOR 56U J
OR	645 003 8181	INDUCTOR,56U J
L1404	645 002 1442	INDUCTOR 18U J
OR	645 003 7986	INDUCTOR,18U J
L2021	645 003 6934	INDUCTOR,100U J
OR	645 003 7634	INDUCTOR,100U J
L2371	645 008 7400	CORE,BEAD
L2372	645 008 7400	CORE,BEAD,EXCEPT VHR-767E
L2373	645 003 6934	INDUCTOR,100U J
OR	645 003 7634	INDUCTOR,100U J
L3001	645 009 3791	CORE,BEAD
L3003	645 009 3791	CORE,BEAD
L3301	645 001 4550	INDUCTOR 10U K
OR	645 003 7900	INDUCTOR,10U K
L3304	645 006 3886	INDUCTOR,1U K,VHR-787G ONLY
OR	645 005 3856	INDUCTOR,1U M,VHR-787G ONLY
L3305	645 001 5441	INDUCTOR,2.2U K,EXCEPT VHR-787G
OR	645 005 3887	INDUCTOR,2.2U M,EXCEPT VHR-787G
L5001 ⚠	645 013 5620	LINE FILTER
L5010	645 006 3602	INDUCTOR,1.1UH
OR	645 024 3417	INDUCTOR,2.0UH
L5101	645 006 3602	INDUCTOR,1.1UH
OR	645 024 3417	INDUCTOR,2.0UH
L5102	645 006 3602	INDUCTOR,1.1UH
OR	645 024 3417	INDUCTOR,2.0UH
	(TRANSFORMERS)	
T2001	645 018 3515	TRANS,OSC,70KHZ
T5001 ⚠	645 020 8676	TRANS,POWER,PULSE
	(CAPACITORS)	
C1001	403 191 8709	ELECT 1U M 50V
C1002	403 189 2405	ELECT 10U M 16V
C1003	403 135 4002	ELECT 47U M 6.3V
C1004	403 068 0409	CERAMIC 0.1U Z 25V
C1005	403 163 7907	ELECT 47U M 6.3V
C1006	403 068 0409	CERAMIC 0.1U Z 25V
C1007	403 191 8709	ELECT 1U M 50V
C1009	403 191 8709	ELECT 1U M 50V
C1010	403 014 9302	CERAMIC 180P J 50V
C1011	403 023 4503	CERAMIC 330P J 50V
C1012	403 020 0508	CERAMIC 27P J 50V
C1013	403 150 6500	ELECT 22U M 16V
C1014	403 069 5601	CERAMIC 0.01U K 50V
C1015	403 022 8304	CERAMIC 33P J 50V
C1016	403 001 1906	CERAMIC 0.01U M 16V
C1017	403 001 1906	CERAMIC 0.01U M 16V
C1018	403 130 3109	CERAMIC 0.047U K 50V
C1019	403 191 8709	ELECT 1U M 50V
C1021	403 130 3109	CERAMIC 0.047U K 50V
C1022	403 109 6308	ELECT 1U M 50V
C1023	403 130 3109	CERAMIC 0.047U K 50V
C1024	403 192 5905	CERAMIC 0.1U K 25V
C1025	403 069 5601	CERAMIC 0.01U K 50V
C1026	403 191 8709	ELECT 1U M 50V
C1027	403 072 1607	CERAMIC 0.022U K 50V
C1028	403 191 8709	ELECT 1U M 50V
C1029	403 163 7907	ELECT 47U M 6.3V
C1030	403 068 0409	CERAMIC 0.1U Z 25V
C1031	403 069 5601	CERAMIC 0.01U K 50V
C1032	403 191 8709	ELECT 1U M 50V
C1033	403 014 3409	CERAMIC 18P J 50V
C1038	403 010 1102	CERAMIC 1000P J 50V
C1040	403 189 2405	ELECT 10U M 16V
C1041	403 020 0409	CERAMIC 27P J 50V
C1043	403 086 2805	NP-ELECT 1U M 50V
C1044	403 026 2803	CERAMIC 47P J 50V
C1046	403 001 3306	CERAMIC 1200P M 16V
C1047	403 028 4102	CERAMIC 56P J 50V
C1048	403 012 6907	CERAMIC 15P J 50V
C1050	403 012 6907	CERAMIC 15P J 50V
C1051	403 026 2803	CERAMIC 47P J 50V
C1052	403 026 2803	CERAMIC 47P J 50V,EXCEPT VHR-767E
C1101	403 191 8709	ELECT 1U M 50V
C1102	403 163 7907	ELECT 47U M 6.3V
C1103	403 068 0409	CERAMIC 0.1U Z 25V
C1104	403 069 5601	CERAMIC 0.01U K 50V
C1105	403 069 5601	CERAMIC 0.01U K 50V

LOCATION	PARTS NO.	DESCRIPTION
C1106	403 069 5601	CERAMIC 0.01U K 50V
C1107	403 069 5601	CERAMIC 0.01U K 50V
C1108	403 192 5905	CERAMIC 0.1U K 25V
C1109	403 068 0409	CERAMIC 0.1U Z 25V
C1301	403 135 4101	ELECT 470U M 6.3V
C1303	403 068 0409	CERAMIC 0.1U Z 25V
C1352	403 191 8709	ELECT 1U M 50V
C1353	403 109 6308	ELECT 1U M 50V,EXCEPT VHR-767E
C1401	403 022 8205	CERAMIC 33P J 50V
C1403	403 109 6308	ELECT 1U M 50V
C1404	403 069 9500	CERAMIC 0.01U Z 50V
C1405	403 135 4002	ELECT 47U M 6.3V
C1406	403 018 0503	CERAMIC 22P J 50V
C1407	403 018 0503	CERAMIC 22P J 50V
C1410	403 009 5807	CERAMIC 100P J 50V
C1411	403 070 5508	CERAMIC 1200P K 50V
C1412	403 109 6308	ELECT 1U M 50V
C1414	403 014 3508	CERAMIC 18P J 50V
C2001	403 191 8709	ELECT 1U M 50V
C2002	403 069 1702	CERAMIC 1000P K 50V
C2003	403 069 5601	CERAMIC 0.01U K 50V
C2004	403 189 2405	ELECT 10U M 16V
C2005	403 167 7002	ELECT 4.7U M 50V
C2006	403 068 0409	CERAMIC 0.1U Z 25V
C2007	403 167 7002	ELECT 4.7U M 50V
C2008	403 068 0409	CERAMIC 0.1U Z 25V
C2009	403 159 8109	ELECT 100U M 6.3V
C2010	403 167 6500	ELECT 33U M 6.3V
C2011	403 167 6500	ELECT 33U M 6.3V
C2012	403 068 0409	CERAMIC 0.1U Z 25V
C2013	403 189 2405	ELECT 10U M 16V
C2016	403 163 8409	ELECT 47U M 16V
C2017	403 075 5305	CERAMIC 8200P K 50V
C2018	403 069 5601	CERAMIC 0.01U K 50V
C2021	403 075 4803	CERAMIC 820P K 50V
C2022	403 070 5508	CERAMIC 1200P K 50V
C2023	403 075 0706	CERAMIC 6800P K 50V
C2024	403 075 0706	CERAMIC 6800P K 50V
C2025	403 193 7809	ELECT 100U M 16V
C2026	403 081 3302	POLYPRO 0.022U J 100V
C2027	403 068 0409	CERAMIC 0.1U Z 25V
C2301	403 189 2405	ELECT 10U M 16V
C2302	403 189 2405	ELECT 10U M 16V
C2303	403 072 1607	CERAMIC 0.022U K 50V
C2304	403 072 1607	CERAMIC 0.022U K 50V
C2305	403 073 9107	CERAMIC 4700P K 50V
C2306	403 073 9107	CERAMIC 4700P K 50V
C2307	403 193 7809	ELECT 100U M 16V
C2308	403 193 7809	ELECT 100U M 16V
C2309	403 070 8806	CERAMIC 1500P K 50V
C2310	403 070 8806	CERAMIC 1500P K 50V
C2311	403 139 1502	ELECT 10U M 16V
C2312	403 139 1502	ELECT 10U M 16V
C2321	403 167 7002	ELECT 4.7U M 50V
C2323	403 193 7809	ELECT 100U M 16V
C2324	403 163 8409	ELECT 47U M 16V
C2325	403 072 1607	CERAMIC 0.022U K 50V
C2326	403 001 1906	CERAMIC 0.01U M 16V
C2327	403 139 1809	ELECT 47U M 16V
C2332	403 193 7809	ELECT 100U M 16V
C2361	403 069 0309	CERAMIC 1000P J 50V,EXCEPT VHR-767E
C2362	403 069 0309	CERAMIC 1000P J 50V,EXCEPT VHR-767E
C2363	403 069 1702	CERAMIC 1000P K 50V
C2364	403 069 1702	CERAMIC 1000P K 50V
C2365	403 018 7502	CERAMIC 220P J 50V
C2366	403 018 7502	CERAMIC 220P J 50V
C2369	403 018 7502	CERAMIC 220P J 50V,EXCEPT VHR-767E
C2370	403 018 7502	CERAMIC 220P J 50V,EXCEPT VHR-767E
C2372	403 071 8102	CERAMIC 2200P K 50V
C3001	403 018 0503	CERAMIC 22P J 50V
C3002	403 012 5900	CERAMIC 15P J 50V
C3004	403 069 5601	CERAMIC 0.01U K 50V
C3005	403 069 5601	CERAMIC 0.01U K 50V
C3008	403 150 6500	ELECT 22U M 16V
C3009	403 069 5601	CERAMIC 0.01U K 50V
C3011	403 068 0409	CERAMIC 0.1U Z 25V
C3012	403 069 5601	CERAMIC 0.01U K 50V
C3014	403 135 4101	ELECT 470U M 6.3V

LOCATION	PARTS NO.	DESCRIPTION
C3016	403 069 5601	CERAMIC 0.01U K 50V
C3017	403 069 1702	CERAMIC 1000P K 50V,EXCEPT VHR-787G
C3019	403 068 0409	CERAMIC 0.1U Z 25V
C3022	403 305 4801	DL-ELECT 0.1F Z 5.5V
C3034	403 069 5601	CERAMIC 0.01U K 50V
C3037	403 028 3402	CERAMIC 56P J 50V,VHR-787G ONLY
OR	403 075 3103	CERAMIC 82P J 50V,EXCEPT VHR-787G
C3040	403 009 5807	CERAMIC 100P J 50V,VHR-787G ONLY
C3041	403 009 5807	CERAMIC 100P J 50V,VHR-787G ONLY
C3042	403 009 5807	CERAMIC 100P J 50V,VHR-787G ONLY
C3043	403 009 5807	CERAMIC 100P J 50V,VHR-787G ONLY
C3301	403 107 9905	ELECT 10U M 16V
C3302	403 107 9905	ELECT 10U M 16V,VHR-787G ONLY
OR	403 134 8100	ELECT 100U M 6.3V,EXCEPT VHR-787G
C3303	403 024 7206	CERAMIC 390P J 50V,VHR-787G ONLY
C3307	403 068 0409	CERAMIC 0.1U Z 25V
C3314	403 189 2405	ELECT 10U M 16V
C3315	403 068 3608	CERAMIC 0.033U Z 25V,EXCEPT VHR-787G
C3316	403 167 7002	ELECT 4.7U M 50V,EXCEPT VHR-787G
C3318	403 011 5000	CERAMIC 120P J 50V
C3320	403 030 7009	CERAMIC 68P J 50V
C3324	403 121 9509	CERAMIC 0.1U Z 50V
C3325	403 068 0409	CERAMIC 0.1U Z 25V
C3401	403 014 9203	CERAMIC 180P J 50V,EXCEPT VHR-787G
C3402	403 168 6202	MT-POLYEST 0.33U J 50V,EXCEPT VHR-787G
C3403	403 184 9805	MT-POLYEST 0.22U J 50V,EXCEPT VHR-787G
C3404	403 193 8905	ELECT 22U M 50V
C3406	403 168 6103	MT-POLYEST 0.1U J 50V,EXCEPT VHR-787G
C3501	403 070 9803	CERAMIC 0.015U K 50V
C3502	403 075 0706	CERAMIC 6800P K 50V
C3503	403 070 9803	CERAMIC 0.015U K 50V
C3504	403 228 8207	ELECT 22U M 16V
C3505	403 228 8207	ELECT 22U M 16V
C3506	403 075 0706	CERAMIC 6800P K 50V
C3507	403 150 6500	ELECT 22U M 16V
C3508	403 150 6500	ELECT 22U M 16V
C3509	403 163 7907	ELECT 47U M 6.3V
C3511	403 071 6504	CERAMIC 220P K 50V
C3512	403 056 9704	POLYESTER 0.01U J 50V
C3513	403 119 6701	CERAMIC 0.068U K 16V
C3514	403 184 9805	MT-POLYEST 0.22U J 50V
C3515	403 063 0206	POLYESTER 6800P K 50V
C3516	403 071 8102	CERAMIC 2200P K 50V
C3517	403 070 8806	CERAMIC 1500P K 50V
C3522	403 069 1207	CERAMIC 1000P K 50V
C3523	403 139 2707	ELECT 1U M 50V
C3524	403 069 5601	CERAMIC 0.01U K 50V
C3525	403 139 2608	ELECT 0.47U M 50V
C3526	403 063 7205	POLYESTER 0.082U J 50V
OR	403 193 7601	ELECT 220U M 6.3V
C3540	403 009 5708	CERAMIC 100P J 50V
C3551	403 175 0903	MT-POLYEST 0.12U J 50V
C3552	403 028 4102	CERAMIC 56P J 50V
C3553	403 191 8709	ELECT 1U M 50V
C3554	403 013 3004	CERAMIC 150P J 50V
C3555	403 069 5601	CERAMIC 0.01U K 50V
C3556	403 069 1702	CERAMIC 1000P K 50V
C3558	403 167 6500	ELECT 33U M 6.3V
C3561	403 058 9306	POLYESTER 0.018U J 50V
C3562	403 138 5600	POLYESTER 5600P J 50V
C3570	403 070 2606	CERAMIC 0.1U Z 50V
C3571	403 070 2606	CERAMIC 0.1U Z 50V
C5001 ⚠	404 055 4905	MT-POLYEST 0.068U M 250V
C5002 ⚠	404 055 4905	MT-POLYEST 0.068U M 250V
C5005 ⚠	404 074 2104	CERAMIC 1000P M 250V
C5007 ⚠	404 074 2104	CERAMIC 1000P M 250V
C5010	403 249 0204	ELECT 47U M 400V
C5011	403 301 1101	ELECT 4.7U M 50V
C5012	403 076 2402	CERAMIC 3300P K 500V
C5013	403 255 8409	CERAMIC 39P J 1K
C5015	403 192 5905	CERAMIC 0.1U K 25V
C5017	403 024 7107	CERAMIC 390P J 50V
C5020	403 255 8508	CERAMIC 47P J 1K
C5021	403 076 0507	CERAMIC 2200P K 500V
C5025	403 255 8409	CERAMIC 39P J 1K
C5101	403 314 0207	ELECT 1000U M 16V
C5102	403 135 3302	ELECT 1000U M 6.3V
C5103	403 314 0108	ELECT 470U M 16V

LOCATION	PARTS NO.	DESCRIPTION
C5104	403 125 5507	ELECT 1000U M 16V
C5105	403 304 9302	ELECT 47U M 50V
C5106	403 301 1309	ELECT 47U M 35V
C5107	403 301 1507	ELECT 220U M 6.3V
C5111	403 125 5606	ELECT 100U M 16V
C5112	403 189 2405	ELECT 10U M 16V
C5113	403 193 9001	ELECT 3.3U M 50V
C5114	403 107 9905	ELECT 10U M 16V
C5115	403 135 7805	ELECT 3.3U M 50V
C5116	403 107 9905	ELECT 10U M 16V
C5117	403 135 7805	ELECT 3.3U M 50V
C5118	403 189 2405	ELECT 10U M 16V
C5123	403 075 6906	CERAMIC 100P K 500V
C5124	403 108 0000	ELECT 0.22U M 50V
C5135	403 057 3107	POLYESTER 0.1U K 50V
	(RESISTORS)	
R1001	401 037 5400	MT-GLAZE 1K JA 1/10W
R1002	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R1003	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R1004	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R1005	401 038 6307	MT-GLAZE 470 JA 1/10W
R1006	401 038 6307	MT-GLAZE 470 JA 1/10W
R1011	401 037 5400	MT-GLAZE 1K JA 1/10W
R1012	401 038 6505	MT-GLAZE 47K JA 1/10W
R1014	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R1015	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R1016	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R1017	401 016 4707	CARBON 22K JA 1/4W
R1024	401 037 5400	MT-GLAZE 1K JA 1/10W
R1025	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1028	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1032	401 037 5400	MT-GLAZE 1K JA 1/10W
R1033	401 018 2701	CARBON 330 JA 1/4W
R1034	401 038 5003	MT-GLAZE 390 JA 1/10W
R1040	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1041	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1042	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1045	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R1046	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1047	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1048	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1049	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1101	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1102	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1104	401 015 2605	CARBON 1.8K JA 1/4W
R1301	401 019 0904	CARBON 390 JA 1/4W
R1303	401 022 6702	CARBON 75 JA 1/4W
R1304	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1312	401 038 0602	MT-GLAZE 220 JA 1/10W
R1313	401 038 2002	MT-GLAZE 270 JA 1/10W
R1352	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1354	401 012 3308	CARBON 10 JA 1/4W,VHR-767E ONLY
R1404	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R1405	401 038 0602	MT-GLAZE 220 JA 1/10W
R1410	401 038 0602	MT-GLAZE 220 JA 1/10W
R2001	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2002	401 037 6803	MT-GLAZE 12K JA 1/10W
R2003	401 037 6803	MT-GLAZE 12K JA 1/10W
R2004	401 038 3801	MT-GLAZE 330K JA 1/10W
R2005	401 037 8500	MT-GLAZE 160 JA 1/10W
R2006	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2007	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2008	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2009	401 038 3900	MT-GLAZE 3.3M JA 1/10W
R2010	401 038 3702	MT-GLAZE 33K JA 1/10W
R2011	401 037 5608	MT-GLAZE 10K JA 1/10W
R2017	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R2021	401 038 2200	MT-GLAZE 27K JA 1/10W
R2022	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R2023	401 037 5400	MT-GLAZE 1K JA 1/10W
R2024	401 038 6208	MT-GLAZE 47 JA 1/10W
R2025	401 011 8809	CARBON 1 JA 1/4W
R2026	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R2027	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R2028	401 037 9101	MT-GLAZE 180 JA 1/10W
R2029	401 037 5608	MT-GLAZE 10K JA 1/10W
R2030	401 038 0800	MT-GLAZE 22K JA 1/10W
R2031	401 037 5004	MT-GLAZE 0.000 ZA 1/10W

LOCATION	PARTS NO.	DESCRIPTION
R2301	401 020 1907	CARBON 4.7K JA 1/4W
R2302	401 020 1907	CARBON 4.7K JA 1/4W
R2303	401 037 8005	MT-GLAZE 15K JA 1/10W,EXCEPT VHR-787G
OR	401 038 2200	MT-GLAZE 27K JA 1/10W,VHR-787G ONLY
R2304	401 037 8005	MT-GLAZE 15K JA 1/10W,EXCEPT VHR-787G
OR	401 038 2200	MT-GLAZE 27K JA 1/10W,VHR-787G ONLY
R2305	401 038 3702	MT-GLAZE 33K JA 1/10W,VHR-787G ONLY
OR	401 038 5300	MT-GLAZE 39K JA 1/10W,EXCEPT VHR-787G
R2306	401 038 3702	MT-GLAZE 33K JA 1/10W,VHR-787G ONLY
OR	401 038 5300	MT-GLAZE 39K JA 1/10W,EXCEPT VHR-787G
R2313	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R2314	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R2315	401 020 1907	CARBON 4.7K JA 1/4W,EXCEPT VHR-767E
R2316	401 020 1907	CARBON 4.7K JA 1/4W,EXCEPT VHR-767E
R2322	401 023 2703	CARBON 8.2K JA 1/4W
R2323	401 038 2200	MT-GLAZE 27K JA 1/10W
R2324	401 038 2200	MT-GLAZE 27K JA 1/10W
R2325	401 014 4006	CARBON 1.5K JA 1/4W
R2327	401 016 3700	CARBON 2.2K JA 1/4W
R2329	401 038 1005	MT-GLAZE 2.2M JA 1/10W
R2331	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R2332	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2333	401 038 2200	MT-GLAZE 27K JA 1/10W,EXCEPT VHR-787G
R2334	401 038 3702	MT-GLAZE 33K JA 1/10W,EXCEPT VHR-787G
R2335	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2336	401 014 4006	CARBON 1.5K JA 1/4W
R2337	401 014 4006	CARBON 1.5K JA 1/4W
R2340	401 018 2701	CARBON 330 JA 1/4W
R2341	401 021 2903	CARBON 5.6K JA 1/4W
R2342	401 021 2903	CARBON 5.6K JA 1/4W
R2343	401 012 4404	CARBON 100 JA 1/4W
R2344	401 012 6903	CARBON 10K JA 1/4W
R2345	401 012 6903	CARBON 10K JA 1/4W
R2347	401 020 1907	CARBON 4.7K JA 1/4W
R2361	401 012 5609	CARBON 1K JA 1/4W,EXCEPT VHR-767E
R2362	401 012 5609	CARBON 1K JA 1/4W,EXCEPT VHR-767E
R2363	401 038 9001	MT-GLAZE 680 JA 1/10W
R2364	401 038 9001	MT-GLAZE 680 JA 1/10W
R2365	401 037 5400	MT-GLAZE 1K JA 1/10W
R2366	401 037 5400	MT-GLAZE 1K JA 1/10W
R2369	401 037 5400	MT-GLAZE 1K JA 1/10W,EXCEPT VHR-767E
R2370	401 037 5400	MT-GLAZE 1K JA 1/10W,EXCEPT VHR-767E
R2379	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2380	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R2381	401 037 5400	MT-GLAZE 1K JA 1/10W
R2392	401 038 9506	MT-GLAZE 75 JA 1/10W,EXCEPT VHR-767E
R2396	401 038 9506	MT-GLAZE 75 JA 1/10W
R3001	⚠ 402 067 7402	FUSIBLE RES 3.3 JA 1/2W
R3004	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R3008	401 020 1907	CARBON 4.7K JA 1/4W
R3009	401 023 1607	CARBON 820 JA 1/4W
R3011	401 020 2805	CARBON 47K JA 1/4W
R3013	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R3014	401 014 9001	CARBON 16K JA 1/4W
R3015	401 014 9001	CARBON 16K JA 1/4W
R3018	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R3019	401 037 9309	MT-GLAZE 18K JA 1/10W
R3023	401 037 5400	MT-GLAZE 1K JA 1/10W
R3024	401 037 5400	MT-GLAZE 1K JA 1/10W
R3025	401 037 5400	MT-GLAZE 1K JA 1/10W
R3026	401 037 5400	MT-GLAZE 1K JA 1/10W
R3032	401 018 4804	CARBON 33K JA 1/4W
R3036	401 016 3700	CARBON 2.2K JA 1/4W
R3037	401 038 2200	MT-GLAZE 27K JA 1/10W,EXCEPT VHR-787G
OR	401 038 5300	MT-GLAZE 39K JA 1/10W,VHR-787G ONLY
R3047	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R3048	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R3049	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R3050	401 016 4707	CARBON 22K JA 1/4W
R3051	401 016 4707	CARBON 22K JA 1/4W
R3056	401 038 6505	MT-GLAZE 47K JA 1/10W,EXCEPT VHR-787G
R3057	401 016 3700	CARBON 2.2K JA 1/4W
R3058	401 016 3700	CARBON 2.2K JA 1/4W
R3059	401 012 6903	CARBON 10K JA 1/4W
R3101	401 012 6903	CARBON 10K JA 1/4W
R3102	401 012 6903	CARBON 10K JA 1/4W
R3103	401 012 6903	CARBON 10K JA 1/4W
R3104	401 012 6903	CARBON 10K JA 1/4W

LOCATION		PARTS NO.	DESCRIPTION
R3301		401 038 5003	MT-GLAZE 390 JA 1/10W
R3302		401 037 7909	MT-GLAZE 1.5K JA 1/10W
R3305		401 038 3603	MT-GLAZE 3.3K JA 1/10W,EXCEPT VHR-787G
R3306		401 039 0403	MT-GLAZE 8.2K JA 1/10W,EXCEPT VHR-787G
R3309	⚠	402 078 2908	FUSIBLE RES 680 GA 1/4W
R3401		401 038 3702	MT-GLAZE 33K JA 1/10W,EXCEPT VHR-787G
R3402		401 037 5608	MT-GLAZE 10K JA 1/10W,EXCEPT VHR-787G
R3403		401 037 6605	MT-GLAZE 120 JA 1/10W,EXCEPT VHR-787G
R3404		401 012 6903	CARBON 10K JA 1/4W,EXCEPT VHR-787G
R3405		401 037 9309	MT-GLAZE 18K JA 1/10W,EXCEPT VHR-787G
R3406		401 037 8005	MT-GLAZE 15K JA 1/10W,EXCEPT VHR-787G
R3407		401 037 6803	MT-GLAZE 12K JA 1/10W,EXCEPT VHR-787G
R3501		401 012 8006	CARBON 100K JA 1/4W
R3502		401 037 5707	MT-GLAZE 100K JA 1/10W
R3503		401 038 3801	MT-GLAZE 330K JA 1/10W
R3504		401 014 6000	CARBON 150K JA 1/4W
R3505		401 014 5102	CARBON 15K JA 1/4W
R3506		401 038 0909	MT-GLAZE 220K JA 1/10W
R3507		401 014 6000	CARBON 150K JA 1/4W
R3508		401 017 2702	CARBON 27K JA 1/4W
R3516		401 039 1004	MT-GLAZE 9.1K JA 1/10W
R3517		401 038 6505	MT-GLAZE 47K JA 1/10W
R3518		401 020 2805	CARBON 47K JA 1/4W
R3519		401 038 3801	MT-GLAZE 330K JA 1/10W
R3520		401 038 5409	MT-GLAZE 390K JA 1/10W
R3521		401 037 5608	MT-GLAZE 10K JA 1/10W
R3525		401 012 5609	CARBON 1K JA 1/4W
R3526		401 038 0701	MT-GLAZE 2.2K JA 1/10W
R3527		401 037 5400	MT-GLAZE 1K JA 1/10W
R3528		401 020 7800	CARBON 510 JA 1/4W
R3529		401 020 7800	CARBON 510 JA 1/4W
R3537		401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3546		401 020 1907	CARBON 4.7K JA 1/4W
R3547		401 037 8005	MT-GLAZE 15K JA 1/10W
R3549		401 037 5608	MT-GLAZE 10K JA 1/10W
R3550		401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3551		401 037 5608	MT-GLAZE 10K JA 1/10W
R3552		401 037 5707	MT-GLAZE 100K JA 1/10W
R3553		401 016 5704	CARBON 220K JA 1/4W
R3555		401 037 5707	MT-GLAZE 100K JA 1/10W
R3556		401 037 5608	MT-GLAZE 10K JA 1/10W
R3557		401 038 3801	MT-GLAZE 330K JA 1/10W
R3558		401 038 6307	MT-GLAZE 470 JA 1/10W
R3560		401 037 5400	MT-GLAZE 1K JA 1/10W
R5001		402 013 9108	SOLID 2.7M KB 1/2W
OR		402 064 1502	CARBON 2.7M KA 1/2W
R5002		401 037 9101	MT-GLAZE 180 JA 1/10W
R5003		401 037 9200	MT-GLAZE 1.8K JA 1/10W
R5004		401 038 3801	MT-GLAZE 330K JA 1/10W
R5005		401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R5006		401 037 5608	MT-GLAZE 10K JA 1/10W
R5007		401 038 0800	MT-GLAZE 22K JA 1/10W
R5009		401 038 9308	MT-GLAZE 68K JA 1/10W
R5010		401 019 3905	CARBON 390K JA 1/4W
R5011		401 019 3905	CARBON 390K JA 1/4W
R5020		401 069 4402	OXIDE-MT 68K JA 2W
R5021		401 069 4402	OXIDE-MT 68K JA 2W
R5101		401 018 2701	CARBON 330 JA 1/4W
R5102		401 038 5003	MT-GLAZE 390 JA 1/10W
R5103		401 021 1807	CARBON 560 JA 1/4W
R5104		401 018 3708	CARBON 3.3K JA 1/4W
R5105		401 016 2505	CARBON 220 JA 1/4W
R5106		401 020 0702	CARBON 470 JA 1/4W
R5108		401 037 9200	MT-GLAZE 1.8K JA 1/10W
R5109		401 018 3708	CARBON 3.3K JA 1/4W
R5110	⚠	402 078 3004	FUSIBLE RES 27 JA 1/4W
OR	⚠	402 071 3100	FUSIBLE RES 27 JA 1/4W
R5111		401 020 7800	CARBON 510 JA 1/4W
R5112		401 038 5102	MT-GLAZE 3.9K JA 1/10W
R5114		401 038 6208	MT-GLAZE 47 JA 1/10W
R5120	⚠	402 004 2705	FUSIBLE RES 8.2 JA 1/4W
R5121		401 015 7709	CARBON 2.7 JA 1/4W
R5123		401 015 2605	CARBON 1.8K JA 1/4W
R5132		401 018 3708	CARBON 3.3K JA 1/4W
R5133		401 023 2703	CARBON 8.2K JA 1/4W
R5134		401 018 3708	CARBON 3.3K JA 1/4W
R5135		401 037 6605	MT-GLAZE 120 JA 1/10W

LOCATION		PARTS NO.	DESCRIPTION
			(FUSES)
F5001	⚠	423 025 9900	FUSE 250V 2.5A
OR	⚠	423 021 8402	FUSE 250V 2.5A
			(PROTECTORS)
PR511	⚠	645 005 9858	PROTECTOR,IC 0.8A 50V
PR512	⚠	645 014 2529	PROTECTOR,1.25A 125V
			(JACKS)
JK231		645 012 4068	JACK,RCA,EXCEPT VHR-767E
JK232		645 012 4051	JACK,RCA,EXCEPT VHR-767E
			(CONNECTORS)
CN231		645 021 1515	SOCKET,RGB 21P (N.S.P),EXCEPT VHR-767E
OR		645 021 1508	SOCKET,RGB 21P (N.S.P),VHR-767E ONLY
CN301		645 009 4361	SOCKET,FFC 31P (N.S.P),EXCEPT VHR-777E
OR		645 005 4808	SOCKET,35P (N.S.P),VHR-777E ONLY
OR		645 005 4761	SOCKET,31P (N.S.P),EXCEPT VHR-777E
OR		645 009 4408	SOCKET,FFC 35P (N.S.P),VHR-777E ONLY
CN303		645 007 8422	PLUG,12P (N.S.P)
CN351		645 007 8927	PLUG,6P (N.S.P)
CN352		645 008 1842	PLUG,8P (N.S.P)
CN501	⚠	645 000 5411	SOCKET,INLET AC (N.S.P)
			(JUMPER)
		401 037 5004	MT-GLAZE 0.000 ZA 1/10W
			(MISCELLANEOUS)
		613 053 8048	FIXER
		645 008 7677	HOLDER,FUSE
OR		645 008 7660	HOLDER,FUSE
OR		645 016 0479	HOLDER,FUSE

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613 172 9162

	(INTEGRATED CIRCUITS)		
IC181	409 391 5401	IC LA70012L	
IC291	409 326 0808	IC LA7256	
	(INDUCTORS)		
L2901	645 003 6910	INDUCTOR,10U J	
OR	645 003 7627	INDUCTOR,10U J	
	(CAPACITORS)		
C1802	403 073 9107	CERAMIC	4700P K 50V
C1805	403 068 0409	CERAMIC	0.1U Z 25V
C1806	403 069 5601	CERAMIC	0.01U K 50V
C1807	403 163 7907	ELECT 47U M 6.3V	
C1808	403 068 0409	CERAMIC	0.1U Z 25V
C1809	403 191 8709	ELECT 1U M 50V	
C1810	403 069 5601	CERAMIC	0.01U K 50V
C1811	403 069 5601	CERAMIC	0.01U K 50V
C1812	403 018 0602	CERAMIC	22P J 50V
C1813	403 018 0602	CERAMIC	22P J 50V
C1814	403 018 0602	CERAMIC	22P J 50V
C1815	403 018 0602	CERAMIC	22P J 50V
C1835	403 069 5601	CERAMIC	0.01U K 50V
C1836	403 072 1607	CERAMIC	0.022U K 50V
C2901	403 193 7601	ELECT 220U M 6.3V	
C2902	403 068 0409	CERAMIC	0.1U Z 25V
C2903	403 068 0409	CERAMIC	0.1U Z 25V
C2904	403 068 0409	CERAMIC	0.1U Z 25V
C2905	403 068 0409	CERAMIC	0.1U Z 25V
C2906	403 068 0409	CERAMIC	0.1U Z 25V
C2907	403 068 0409	CERAMIC	0.1U Z 25V
C2908	403 068 0409	CERAMIC	0.1U Z 25V
C2910	403 068 0409	CERAMIC	0.1U Z 25V
C2911	403 068 0409	CERAMIC	0.1U Z 25V
	(RESISTORS)		
R1801	401 038 5102	MT-GLAZE	3.9K JA 1/10W
R1802	401 038 0701	MT-GLAZE	2.2K JA 1/10W
R1804	401 038 9001	MT-GLAZE	680 JA 1/10W
R1805	401 038 9001	MT-GLAZE	680 JA 1/10W
R1806	401 038 6406	MT-GLAZE	4.7K JA 1/10W
R1807	401 037 5400	MT-GLAZE	1K JA 1/10W
R1808	401 037 5400	MT-GLAZE	1K JA 1/10W
R1831	401 037 5004	MT-GLAZE	0.000 ZA 1/10W
R1833	401 037 5004	MT-GLAZE	0.000 ZA 1/10W
R2901	401 037 7909	MT-GLAZE	1.5K JA 1/10W
R2902	401 038 0206	MT-GLAZE	20K JA 1/10W
R2903	401 037 5400	MT-GLAZE	1K JA 1/10W
R2904	401 037 5400	MT-GLAZE	1K JA 1/10W

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN182	645 009 4163	SOCKET,FFC 12P (N.S.P)
OR	645 005 4204	SOCKET,12P (N.S.P)
	(JUMPER)	
	401 037 5004	MT-GLAZE 0.000 ZA 1/10W

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	613 174 1409 (VHR-787G ONLY)	
OR	613 173 9192 (VHR-767E ONLY)	
OR	613 173 0458 (VHR-777E ONLY)	
	(SEMICONDUCTORS)	
Q7101	405 000 3103	TR DTC114ES,VHR-777E ONLY
Q7102	405 000 3103	TR DTC114ES,VHR-777E ONLY
Q7103	405 000 3103	TR DTC114ES,VHR-777E ONLY
	(DIODES)	
D7101	407 012 4406	DIODE 1SS133
D7102	407 012 4406	DIODE 1SS133
D7103	407 012 4406	DIODE 1SS133
D7104	407 012 4406	DIODE 1SS133
D7108	407 168 5302	LED SEL1410G, PLAY-LED,VHR-777E ONLY
OR	407 197 2808	LED L-53GD-TNB5/6-R, PLAY-LED, VHR-777E ONLY
OR	407 168 5203	LED SEL1410G, PLAY-LED,VHR-777E ONLY
D7109	407 168 5203	LED SEL1410G, FF-LED,VHR-777E ONLY
OR	407 168 5302	LED SEL1410G, FF-LED,VHR-777E ONLY
OR	407 197 2808	LED L-53GD-TNB5/6-R, FF-LED,VHR-777E ONLY
D7110	407 168 5302	LED SEL1410G, REW-LED,VHR-777E ONLY
OR	407 197 2808	LED L-53GD-TNB5/6-R, REW-LED, VHR-777E ONLY
OR	407 168 5203	LED SEL1410G, REW-LED,VHR-777E ONLY
	(CAPACITORS)	
C7101	403 167 7002	ELECT 4.7U M 50V,EXCEPT VHR-767E
OR	403 043 8802	ELECT 4.7U M 16V,VHR-767E ONLY
	(RESISTORS)	
R7101	401 015 8805	CARBON 200 JA 1/4W,VHR-777E ONLY
R7102	401 015 8805	CARBON 200 JA 1/4W,VHR-777E ONLY
R7103	401 015 8805	CARBON 200 JA 1/4W,VHR-777E ONLY
	(SWITCHES)	
S7101	645 006 2797	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-787G
OR	645 008 8049	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-787G
OR	645 001 9777	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-787G
OR	645 011 5172	SWITCH,PUSH 1P-1T, POWER,VHR-767E ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, POWER,VHR-767E ONLY
S7102	645 006 2797	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-777E
OR	645 008 8049	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-777E
OR	645 001 9777	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-777E
OR	645 011 5172	SWITCH,PUSH 1P-1T, STOP/EJECT, VHR-767E ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, STOP/EJECT, VHR-767E ONLY
S7103	645 006 2797	SWITCH,PUSH 1P-1T, CH-UP
OR	645 008 8049	SWITCH,PUSH 1P-1T, CH-UP
OR	645 001 9777	SWITCH,PUSH 1P-1T, CH-UP
OR	645 011 5172	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-777E
OR	645 011 5165	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-777E
S7104	645 008 8049	SWITCH,PUSH 1P-1T, CH-DOWN
OR	645 011 5165	SWITCH,PUSH 1P-1T, CH-DOWN
OR	645 001 9777	SWITCH,PUSH 1P-1T, CH-DOWN
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-DOWN
OR	645 011 5172	SWITCH,PUSH 1P-1T, CH-DOWN
S7105	645 008 8049	SWITCH,PUSH 1P-1T, REC,VHR-777E ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, REC,VHR-777E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, REC,VHR-777E ONLY
OR	645 011 5172	SWITCH,PUSH 1P-1T, REC,VHR-777E ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, REC,VHR-777E ONLY
S7106	645 006 2797	SWITCH,PUSH 1P-1T, PAUSE
OR	645 008 8049	SWITCH,PUSH 1P-1T, PAUSE
S7106	645 001 9777	SWITCH,PUSH 1P-1T, PAUSE
OR	645 011 5172	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-777E
OR	645 011 5165	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-777E
S7107	613 079 4178	SW,PUSH, REW,VHR-787G ONLY
OR	613 006 3700	PUSH SWITCH, REW,VHR-787G ONLY
OR	645 005 1302	SWITCH,PUSH 1P-1T, REW,VHR-787G ONLY
OR	613 093 8596	SW,PUSH, REW,VHR-787G ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, REW,VHR-767E ONLY
OR	645 011 5172	SWITCH,PUSH 1P-1T, REW,VHR-767E ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, REW,VHR-767E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, REW,VHR-767E ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, REW,VHR-767E ONLY
S7108	645 008 8049	SWITCH,PUSH 1P-1T, FF,VHR-777E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, FF,VHR-777E ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, FF,VHR-777E ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, PLAY,VHR-767E ONLY
OR	645 011 5172	SWITCH,PUSH 1P-1T, PLAY,VHR-767E ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, PLAY,VHR-767E ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, PLAY,VHR-767E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, PLAY,VHR-767E ONLY
OR	613 093 8596	SW,PUSH, PLAY,VHR-787G ONLY
OR	645 005 1302	SWITCH,PUSH 1P-1T, PLAY,VHR-787G ONLY
S7109	645 008 8049	SWITCH,PUSH 1P-1T, FF,VHR-767E ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, FF,VHR-767E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, FF,VHR-767E ONLY
OR	645 011 5172	SWITCH,PUSH 1P-1T, FF,VHR-767E ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, FF,VHR-767E ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, REW,VHR-777E ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, REW,VHR-777E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, REW,VHR-777E ONLY
OR	645 005 1302	SWITCH,PUSH 1P-1T, FF,VHR-787G ONLY
OR	613 093 8596	SW,PUSH, FF,VHR-787G ONLY
S7110	645 001 9777	SWITCH,PUSH 1P-1T, REC,VHR-767E ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, REC,VHR-767E ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, REC,VHR-767E ONLY
OR	645 011 5172	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-777E
OR	645 011 5165	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-777E
OR	645 001 9777	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-767E
OR	645 006 2797	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-767E
OR	645 008 8049	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-767E
S7111	645 006 2797	SWITCH,PUSH 1P-1T, PLAY,VHR-777E ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, PLAY,VHR-777E ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, PLAY,VHR-777E ONLY
	(REMOTE RECEIVERS)	
RR711	645 006 8720	UNIT,IR RECEIVER PACK
OR	645 021 6152	UNIT,IR RECEIVER PACK
	(DISPLAYS)	
A7101	645 020 9437	FLUORESCENT TUBE
OR	645 004 0597	FLUORESCENT TUBE
	(CONNECTORS)	
CN711	645 005 4761	SOCKET,31P (N.S.P),EXCEPT VHR-777E
OR	645 009 4361	SOCKET,FFC 31P (N.S.P),EXCEPT VHR-777E
CN714	645 009 4408	SOCKET,FFC 35P (N.S.P),VHR-777E ONLY
OR	645 005 4808	SOCKET,35P (N.S.P),VHR-777E ONLY
	(MISCELLANEOUS)	
	613 173 7488	HOLDER,IR
OR	613 163 1700	HOLDER IR
	613 139 2267	HOLDER FL

COMPL PWB,TM-2

	613 174 1393 (VHR-787G ONLY)	
	(SWITCHES)	
S7201	645 008 8049	SWITCH,PUSH 1P-1T, POWER,VHR-787G ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, POWER,VHR-787G ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, POWER,VHR-787G ONLY
OR	645 011 5172	SWITCH,PUSH 1P-1T, POWER,VHR-787G ONLY
OR	645 011 5165	SWITCH,PUSH 1P-1T, POWER,VHR-787G ONLY
	(CONNECTOR)	
CN721	645 003 1748	SOCKET,RIBBON 3P (N.S.P),VHR-787G ONLY

LOCATION	PARTS NO.	DESCRIPTION

COMPL PCB,TM-9

613 158 5751 (EXCEPT VHR-767E)

	(INTEGRATED CIRCUITS)	
IC771	409 340 9600	IC SDA5649,EXCEPT VHR-767E
	(CAPACITORS)	
C7701	403 060 7505	POLYESTER 0.033U J 50V,EXCEPT VHR-767E
C7702	403 071 8102	CERAMIC 2200P K 50V,EXCEPT VHR-767E
C7703	403 256 4608	MT-COMPO 0.33U J 50V,EXCEPT VHR-767E
C7704	403 013 3004	CERAMIC 150P J 50V,EXCEPT VHR-767E
C7705	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-767E
C7706	403 129 0409	CERAMIC 0.01U K 16V,EXCEPT VHR-767E
	(RESISTORS)	
R7701	401 038 9209	MT-GLAZE 6.8K JA 1/10W,EXCEPT VHR-767E
R7702	401 037 7008	MT-GLAZE 1.2M JA 1/10W,EXCEPT VHR-767E
R7703	401 038 9209	MT-GLAZE 6.8K JA 1/10W,EXCEPT VHR-767E
R7704	401 037 7008	MT-GLAZE 1.2M JA 1/10W,EXCEPT VHR-767E
R7705	401 037 5806	MT-GLAZE 1M JA 1/10W,EXCEPT VHR-767E
R7706	401 038 0701	MT-GLAZE 2.2K JA 1/10W,EXCEPT VHR-767E
R7707	401 037 5707	MT-GLAZE 100K JA 1/10W,EXCEPT VHR-767E
R7708	401 037 5608	MT-GLAZE 10K JA 1/10W,EXCEPT VHR-767E
	(CONNECTORS)	
CN771	613 113 3853	CONNECTOR,5P (N.S.P),EXCEPT VHR-767E
OR	645 003 0840	PLUG,5P (N.S.P),EXCEPT VHR-767E

COMPL PWB,TN-3

613 173 4470 (VHR-787G ONLY)

	(SEMICONDUCTORS)	
Q6301	405 099 8607	TR 2SC4640T,VHR-787G ONLY
OR	405 011 8401	TR 2SC1740S-Q,VHR-787G ONLY
OR	405 099 8508	TR 2SC4640S,VHR-787G ONLY
OR	405 093 0607	TR KSC2785-Y,VHR-787G ONLY
OR	405 011 8500	TR 2SC1740S-R,VHR-787G ONLY
	(INTEGRATED CIRCUITS)	
IC631	409 370 6504	IC TDA9840,VHR-787G ONLY
IC632	409 002 5905	IC BA403,VHR-787G ONLY
	(CRYSTAL DEVICES)	
X6301	645 002 0711	OSC,CRYSTAL 10MHZ,VHR-787G ONLY
	(CERAMIC RESONATORS)	
XF631	645 020 7914	DISCR,CERAMIC 5.74MHZ,VHR-787G ONLY
XF632	645 006 3022	CERAMIC FILTER 5.742MHZ,VHR-787G ONLY
	(VARIABLE RESISTORS)	
VR631	645 001 9487	VR,SEMI 22K N,VHR-787G ONLY
OR	645 003 5692	VR,SEMI,22K N,VHR-787G ONLY
	(INDUCTORS)	
L6301	645 002 1428	INDUCTOR 15U J,VHR-787G ONLY
OR	645 003 7955	INDUCTOR,15U J,VHR-787G ONLY
L6302	645 003 7627	INDUCTOR,10U J,VHR-787G ONLY
OR	645 003 6910	INDUCTOR,10U J,VHR-787G ONLY
L6303	645 003 6910	INDUCTOR,10U J,VHR-787G ONLY
OR	645 003 7627	INDUCTOR,10U J,VHR-787G ONLY
	(TRANSFORMERS)	
T6301	645 020 7921	TRANS,IF 54.7MHZ,VHR-787G ONLY
	(CAPACITORS)	
C6301	403 009 1809	CERAMIC 10P J 50V,VHR-787G ONLY
C6302	403 024 1501	CERAMIC 39P J 50V,VHR-787G ONLY
C6303	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6304	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6305	403 107 9905	ELECT 10U M 16V,VHR-787G ONLY
C6306	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6307	403 125 5606	ELECT 100U M 16V,VHR-787G ONLY
C6308	403 134 8100	ELECT 100U M 6.3V,VHR-787G ONLY
C6309	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6310	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6311	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6312	403 121 3507	ELECT 4.7U M 50V,VHR-787G ONLY
C6313	403 121 3507	ELECT 4.7U M 50V,VHR-787G ONLY
C6314	403 107 9905	ELECT 10U M 16V,VHR-787G ONLY
C6315	403 001 1906	CERAMIC 0.01U M 16V,VHR-787G ONLY
C6316	403 121 9509	CERAMIC 0.1U Z 50V,VHR-787G ONLY
C6317	403 026 2209	CERAMIC 47P J 50V,VHR-787G ONLY
C6318	403 134 8100	ELECT 100U M 6.3V,VHR-787G ONLY
C6319	403 107 9905	ELECT 10U M 16V,VHR-787G ONLY
C6320	403 107 9905	ELECT 10U M 16V,VHR-787G ONLY
C6321	403 001 5102	CERAMIC 2200P M 16V,VHR-787G ONLY

LOCATION	PARTS NO.	DESCRIPTION
	(RESISTORS)	
R6301	401 014 4006	CARBON 1.5K JA 1/4W,VHR-787G ONLY
R6303	401 018 2701	CARBON 330 JA 1/4W,VHR-787G ONLY
R6304	401 021 1807	CARBON 560 JA 1/4W,VHR-787G ONLY
R6305	401 012 5609	CARBON 1K JA 1/4W,VHR-787G ONLY
R6306	401 012 5609	CARBON 1K JA 1/4W,VHR-787G ONLY
R6307	401 013 6308	CARBON 12K JA 1/4W,VHR-787G ONLY
R6308	401 023 2703	CARBON 8.2K JA 1/4W,VHR-787G ONLY
R6311	401 020 1907	CARBON 4.7K JA 1/4W,VHR-787G ONLY
R6312	401 012 6903	CARBON 10K JA 1/4W,VHR-787G ONLY
R6313	401 017 2702	CARBON 27K JA 1/4W,VHR-787G ONLY
	(CONNECTORS)	
CN631	645 003 0925	PLUG,11P (N.S.P),VHR-787G ONLY

COMPL PWB,TN-5

613 161 6226 (EXCEPT VHR-787G)

	(SEMICONDUCTORS)	
Q6701	405 015 8407	TR 2SC2812-L5,EXCEPT VHR-787G
OR	405 015 8704	TR 2SC2812-L6,EXCEPT VHR-787G
OR	405 014 4608	TR 2SC2412K-S,EXCEPT VHR-787G
OR	405 014 4509	TR 2SC2412K-R,EXCEPT VHR-787G
Q6741	405 002 6508	TR 2SA1179-M5,EXCEPT VHR-787G
OR	405 002 0407	TR 2SA1037K-S,EXCEPT VHR-787G
OR	405 002 0308	TR 2SA1037K-R,EXCEPT VHR-787G
OR	405 002 6706	TR 2SA1179-M6,EXCEPT VHR-787G
Q6742	405 002 6508	TR 2SA1179-M5,EXCEPT VHR-787G
OR	405 002 0308	TR 2SA1037K-R,EXCEPT VHR-787G
OR	405 002 6706	TR 2SA1179-M6,EXCEPT VHR-787G
OR	405 002 0407	TR 2SA1037K-S,EXCEPT VHR-787G
	(INTEGRATED CIRCUITS)	
IC671	409 374 6302	IC SAA7283(M2),EXCEPT VHR-787G
OR	409 344 9807	IC SAA7283GP(M1),EXCEPT VHR-787G
	(DIODES)	
D6701	407 169 8005	VARACTOR DI BB405B,EXCEPT VHR-787G
D6702	407 012 4406	DIODE 1SS133,EXCEPT VHR-787G
OR	407 007 9904	DIODE GMA01,EXCEPT VHR-787G
	(CRYSTAL DEVICES)	
X6701	645 007 7449	OSC,CRYSTAL 8.192MHZ,EXCEPT VHR-787G
	(INDUCTORS)	
L6701	645 003 7429	INDUCTOR,2.2U J,EXCEPT VHR-787G
OR	645 003 7023	INDUCTOR,2.2U J,EXCEPT VHR-787G
L6702	645 003 7023	INDUCTOR,2.2U J,EXCEPT VHR-787G
OR	645 003 7429	INDUCTOR,2.2U J,EXCEPT VHR-787G
L6703	645 002 1411	INDUCTOR 10U J,EXCEPT VHR-787G
OR	645 003 7894	INDUCTOR,10U J,EXCEPT VHR-787G
L6704	645 003 7023	INDUCTOR,2.2U J,EXCEPT VHR-787G
OR	645 003 7429	INDUCTOR,2.2U J,EXCEPT VHR-787G
L6705	645 003 7429	INDUCTOR,2.2U J,EXCEPT VHR-787G
OR	645 003 7023	INDUCTOR,2.2U J,EXCEPT VHR-787G
	(CAPACITORS)	
C6701	403 159 1001	CERAMIC 0.22U Z 16V,EXCEPT VHR-787G
C6702	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-787G
C6703	403 135 4002	ELECT 47U M 6.3V,EXCEPT VHR-787G
C6704	403 159 1001	CERAMIC 0.22U Z 16V,EXCEPT VHR-787G
C6705	403 184 9300	MT-POLYEST 0.047U J 50V,EXCEPT VHR-787G
C6706	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
C6707	403 134 9602	ELECT 47U M 16V,EXCEPT VHR-787G
C6708	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6709	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
C6710	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-787G
C6711	403 008 7505	CERAMIC 10P D 50V,EXCEPT VHR-787G
C6712	403 024 7206	CERAMIC 390P J 50V,EXCEPT VHR-787G
C6714	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6715	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
C6716	403 018 7502	CERAMIC 220P J 50V,EXCEPT VHR-787G
C6717	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
C6718	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-787G
C6719	403 109 6308	ELECT 1U M 50V,EXCEPT VHR-787G
C6720	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-787G
C6721	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6722	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
C6723	403 168 6202	MT-POLYEST 0.33U J 50V,EXCEPT VHR-787G
C6724	403 072 1607	CERAMIC 0.022U K 50V,EXCEPT VHR-787G
C6725	403 026 2803	CERAMIC 47P J 50V,EXCEPT VHR-787G
C6726	403 026 2803	CERAMIC 47P J 50V,EXCEPT VHR-787G

LOCATION	PARTS NO.	DESCRIPTION
C6727	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-787G
C6728	403 130 2904	ELECT 0.47U M 50V,EXCEPT VHR-787G
C6729	403 135 4002	ELECT 47U M 6.3V,EXCEPT VHR-787G
C6730	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6731	403 068 0409	CERAMIC 0.1U Z 25V,EXCEPT VHR-787G
C6732	403 135 4002	ELECT 47U M 6.3V,EXCEPT VHR-787G
C6733	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6734	403 125 5606	ELECT 100U M 16V,EXCEPT VHR-787G
C6741	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6742	403 069 5601	CERAMIC 0.01U K 50V,EXCEPT VHR-787G
C6743	403 073 0005	CERAMIC 3300P K 50V,EXCEPT VHR-787G
C6744	403 073 0005	CERAMIC 3300P K 50V,EXCEPT VHR-787G
C6745	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
C6746	403 107 9905	ELECT 10U M 16V,EXCEPT VHR-787G
	(RESISTORS)	
R6701	401 037 9200	MT-GLAZE 1.8K JA 1/10W,EXCEPT VHR-787G
R6702	401 038 3702	MT-GLAZE 33K JA 1/10W,EXCEPT VHR-787G
R6703	401 038 0701	MT-GLAZE 2.2K JA 1/10W,EXCEPT VHR-787G
R6704	401 037 8005	MT-GLAZE 15K JA 1/10W,EXCEPT VHR-787G
R6705	401 037 5400	MT-GLAZE 1K JA 1/10W,EXCEPT VHR-787G
R6706	401 037 5202	MT-GLAZE 100 JA 1/10W,EXCEPT VHR-787G
R6708	401 038 0701	MT-GLAZE 2.2K JA 1/10W,EXCEPT VHR-787G
R6709	401 037 5608	MT-GLAZE 10K JA 1/10W,EXCEPT VHR-787G
R6710	401 038 0800	MT-GLAZE 22K JA 1/10W,EXCEPT VHR-787G
R6712	401 037 5004	MT-GLAZE 0.000 ZA 1/10W,EXCEPT VHR-787G
R6714	401 037 5608	MT-GLAZE 10K JA 1/10W,EXCEPT VHR-787G
R6715	401 038 0800	MT-GLAZE 22K JA 1/10W,EXCEPT VHR-787G
R6716	401 037 5806	MT-GLAZE 1M JA 1/10W,EXCEPT VHR-787G
R6717	401 037 5608	MT-GLAZE 10K JA 1/10W,EXCEPT VHR-787G
R6718	401 038 9407	MT-GLAZE 680K JA 1/10W,EXCEPT VHR-787G
R6741	401 037 7909	MT-GLAZE 1.5K JA 1/10W,EXCEPT VHR-787G
R6742	401 037 7909	MT-GLAZE 1.5K JA 1/10W,EXCEPT VHR-787G
R6743	401 037 7909	MT-GLAZE 1.5K JA 1/10W,EXCEPT VHR-787G
R6744	401 037 7909	MT-GLAZE 1.5K JA 1/10W,EXCEPT VHR-787G
R6745	401 038 0701	MT-GLAZE 2.2K JA 1/10W,EXCEPT VHR-787G
R6746	401 038 0701	MT-GLAZE 2.2K JA 1/10W,EXCEPT VHR-787G
R6747	401 037 5400	MT-GLAZE 1K JA 1/10W,EXCEPT VHR-787G
R6748	401 037 5400	MT-GLAZE 1K JA 1/10W,EXCEPT VHR-787G
	(CONNECTOR)	
CN671	645 003 0925	PLUG,11P (N.S.P),EXCEPT VHR-787G

COMPL PWB,MC-1

613 173 9451

	(CAPACITORS)	
C8001	403 121 9509	CERAMIC 0.1U Z 50V
	(RESISTORS)	
R8001	401 015 2605	CARBON 1.8K JA 1/4W
R8002	401 023 1607	CARBON 820 JA 1/4W
R8003	401 017 0708	CARBON 270 JA 1/4W
R8004	401 014 2804	CARBON 150 JA 1/4W
	(SWITCHES)	
S8002	645 009 3388	SWITCH,DETECTOR 1P-1T,
OR	645 003 4589	SWITCH,DETECTOR 1P-1T,
	(CONNECTORS)	
CN801	645 007 8446	SOCKET,12P (N.S.P)
	(MISCELLANEOUS)	
	613 152 4002	SPACER,MC1

FLEXIBLE FLAT CABLES

	645 017 0652	FLEXIBLE FLAT CABLE,VHR-777E ONLY
OR	645 017 0645	FLEXIBLE FLAT CABLE,EXCEPT VHR-777E

SANYO Electric Co.,Ltd.
Osaka, Japan

Jan./'97 / 2500 NS Printed in Japan

VHR-767E
VHR-777E
VHR-787G

BLOCK DIAGRAMS,CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS

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REFERENCE No.SM531567

NOTES:

1. All resistance values in "OHMS" unless otherwise noted.
   (K=1,000 ; M=1,000,000)
2. All capacitance values in "μF" unless otherwise noted.
   p=pico farad ; μ ,u or U=micro farad
3. All inductance values in "μH" unless otherwise noted.
   μ ,u or U=micro henry ; m=milli henry

PRODUCT SAFETY NOTICE

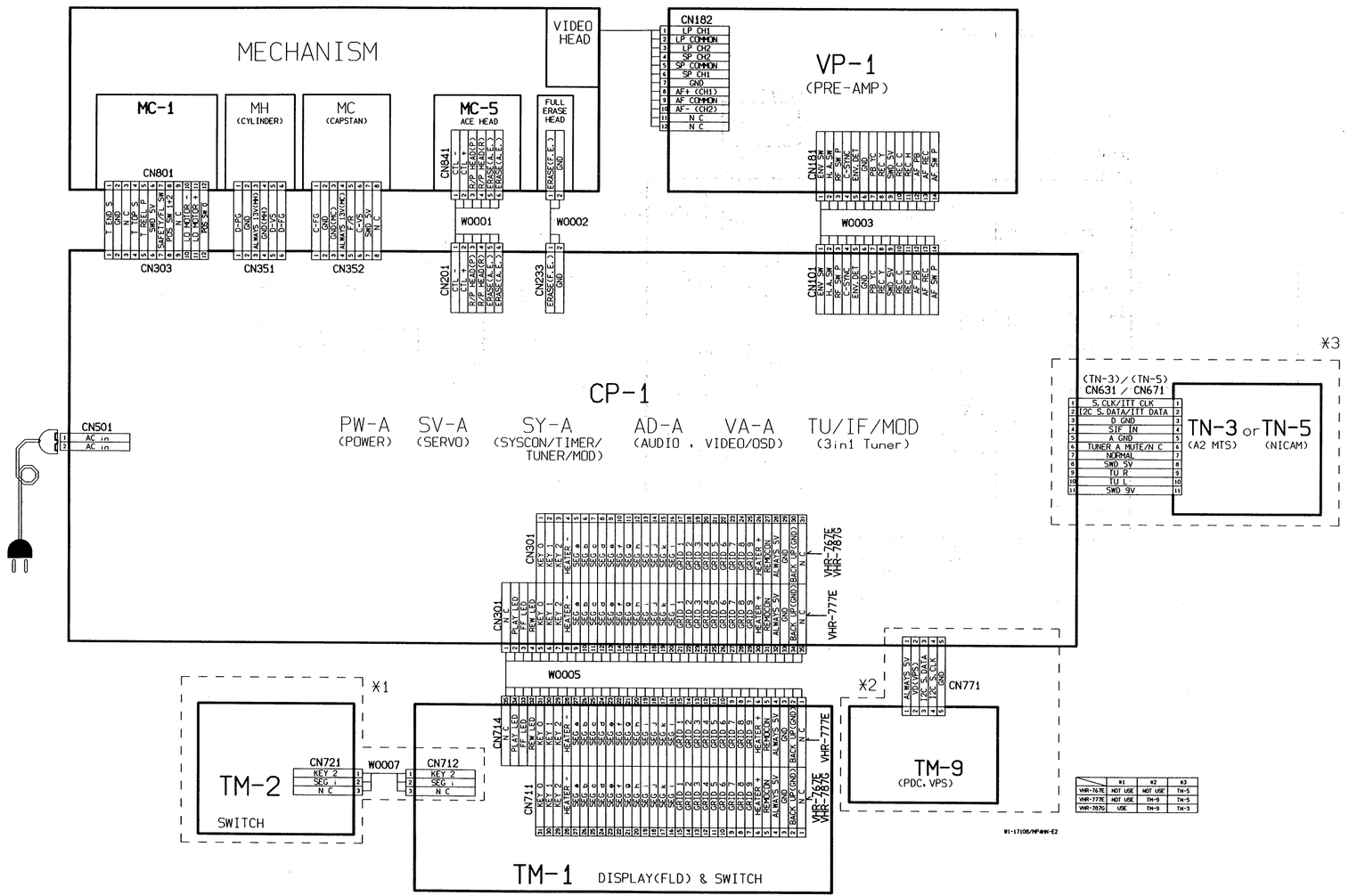
THE COMPONENTS DESIGNATED BY A SYMBOL (⚠) IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A SYMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST.
DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

EXPLANATORY NOTES (EXAMPLES)

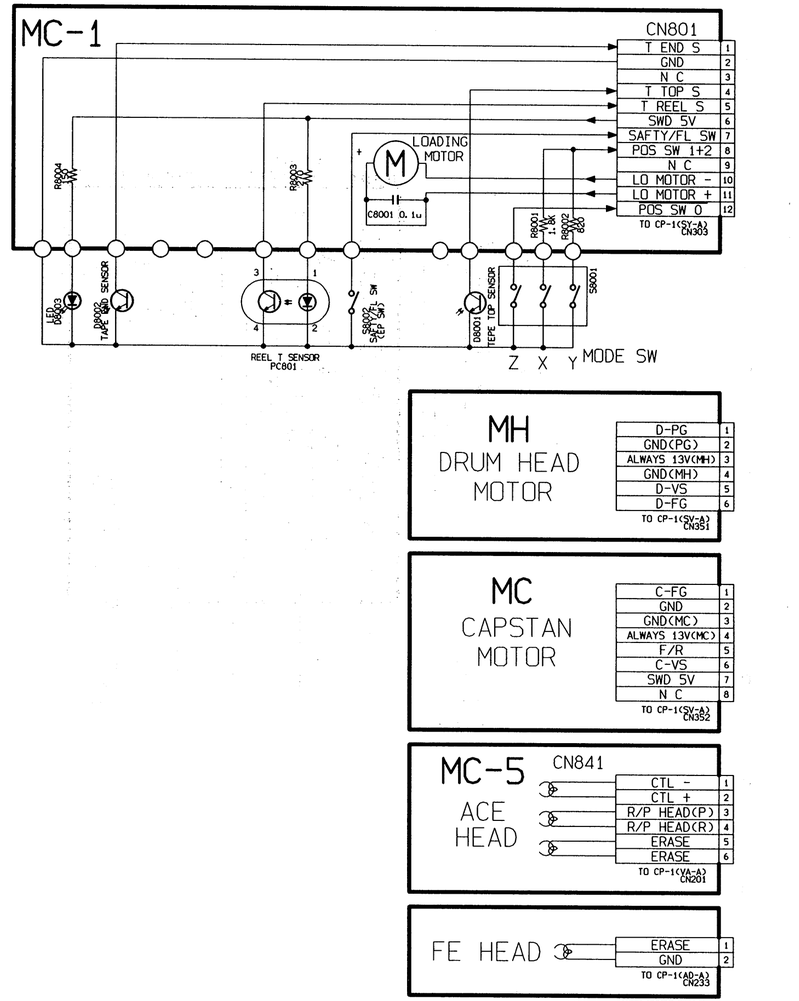
Resistor	10K:16J means 10kilo ohm ±5%, 1/16watt max.
	1M:1/10K means 1mega ohm ±10%, 1/10watt max.
Capacitor	0.047:F means 0.047micro farad, Ftype.
Chemical capacitor	
	10:16 means 10micro farad, 16volt max.
Inductor	330:J means 330micro henry ±5%
	470:K means 470micro henry ±10%

1. OVERALL WIRING,MECHANISM CONNECTION & BLOCK DIAGRAMS

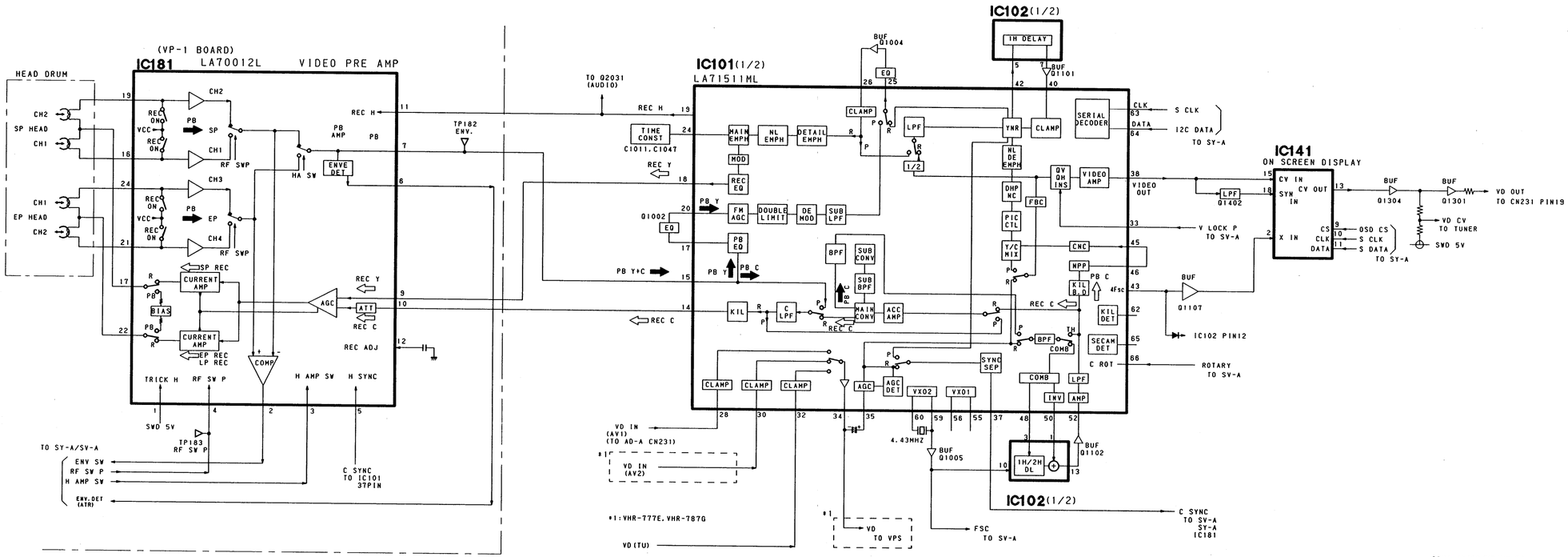
OVERALL WIRING



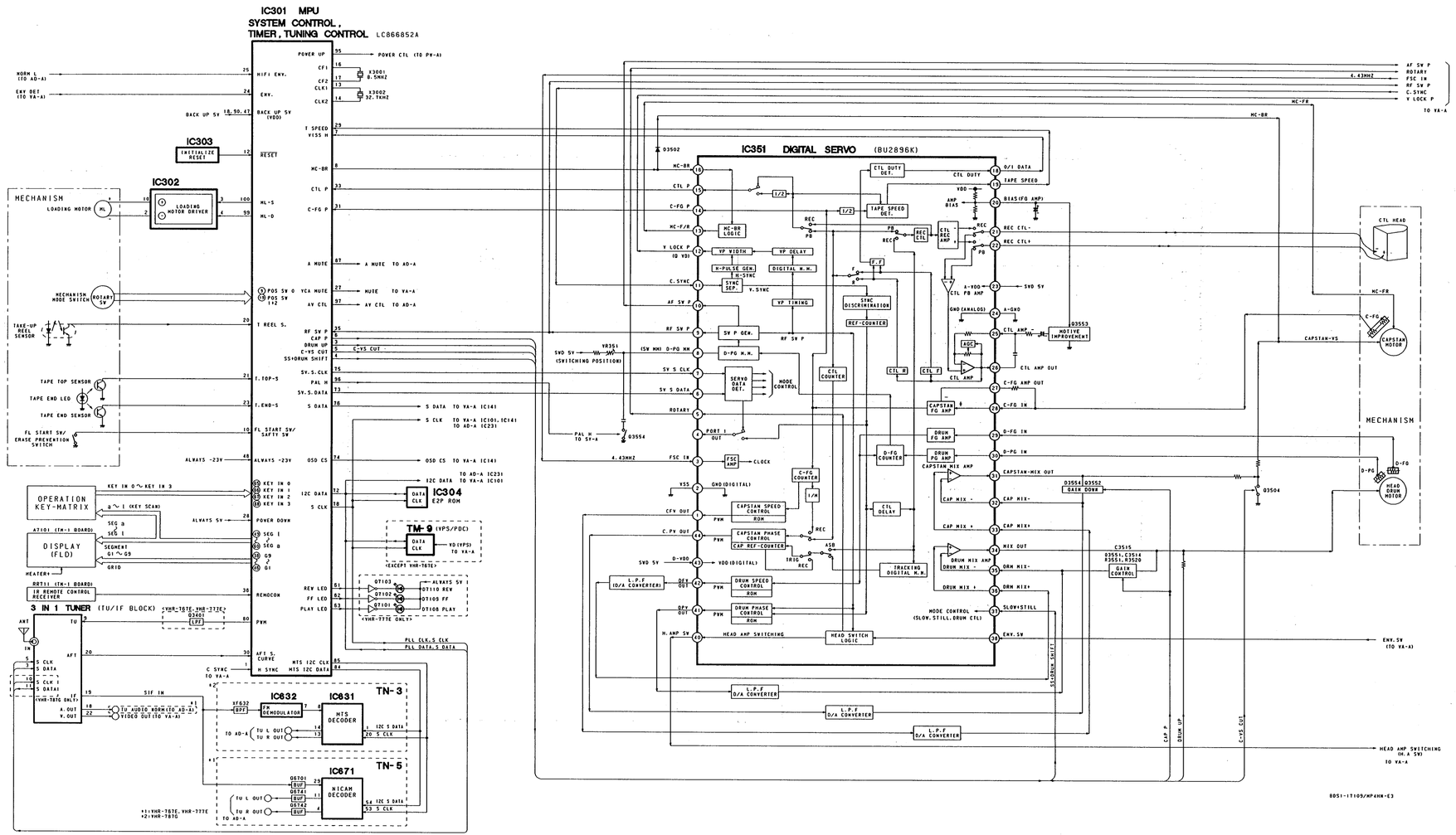
MECHANISM CONNECTION



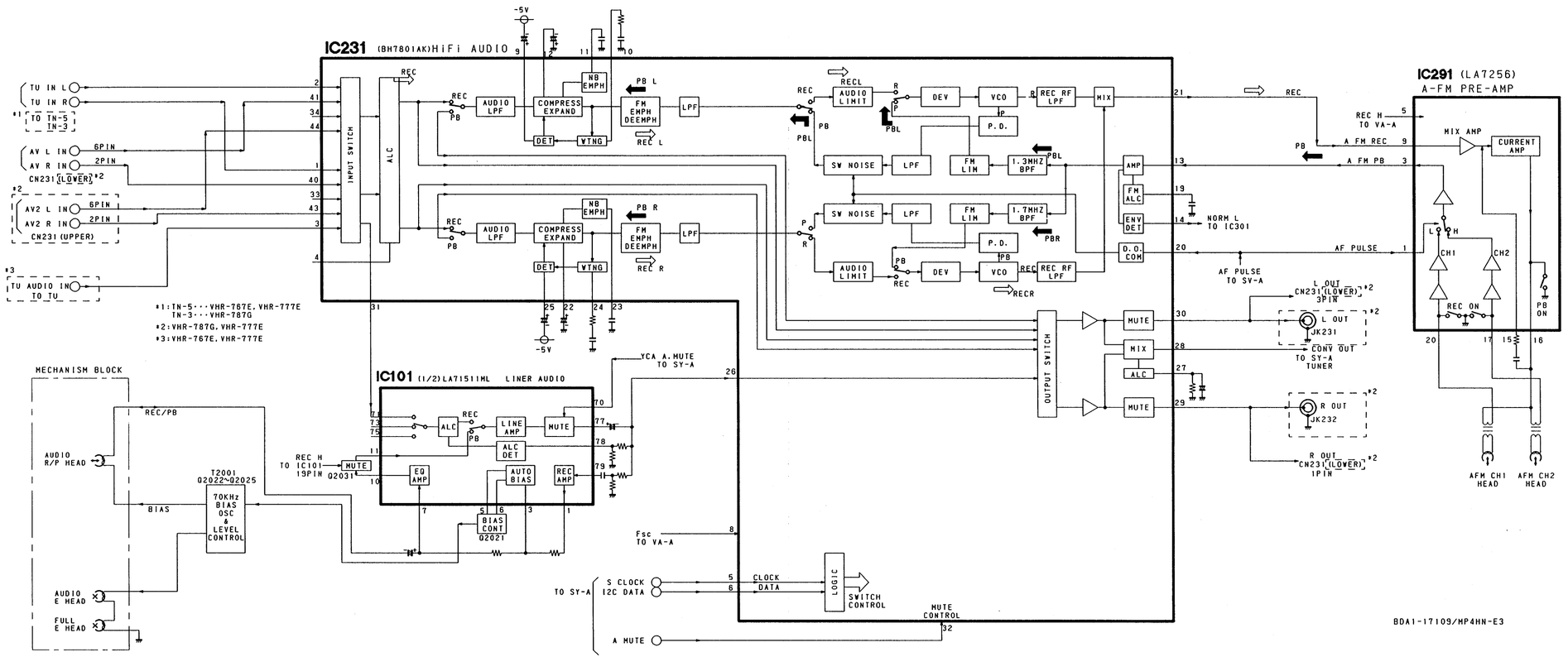
VIDEO CIRCUIT



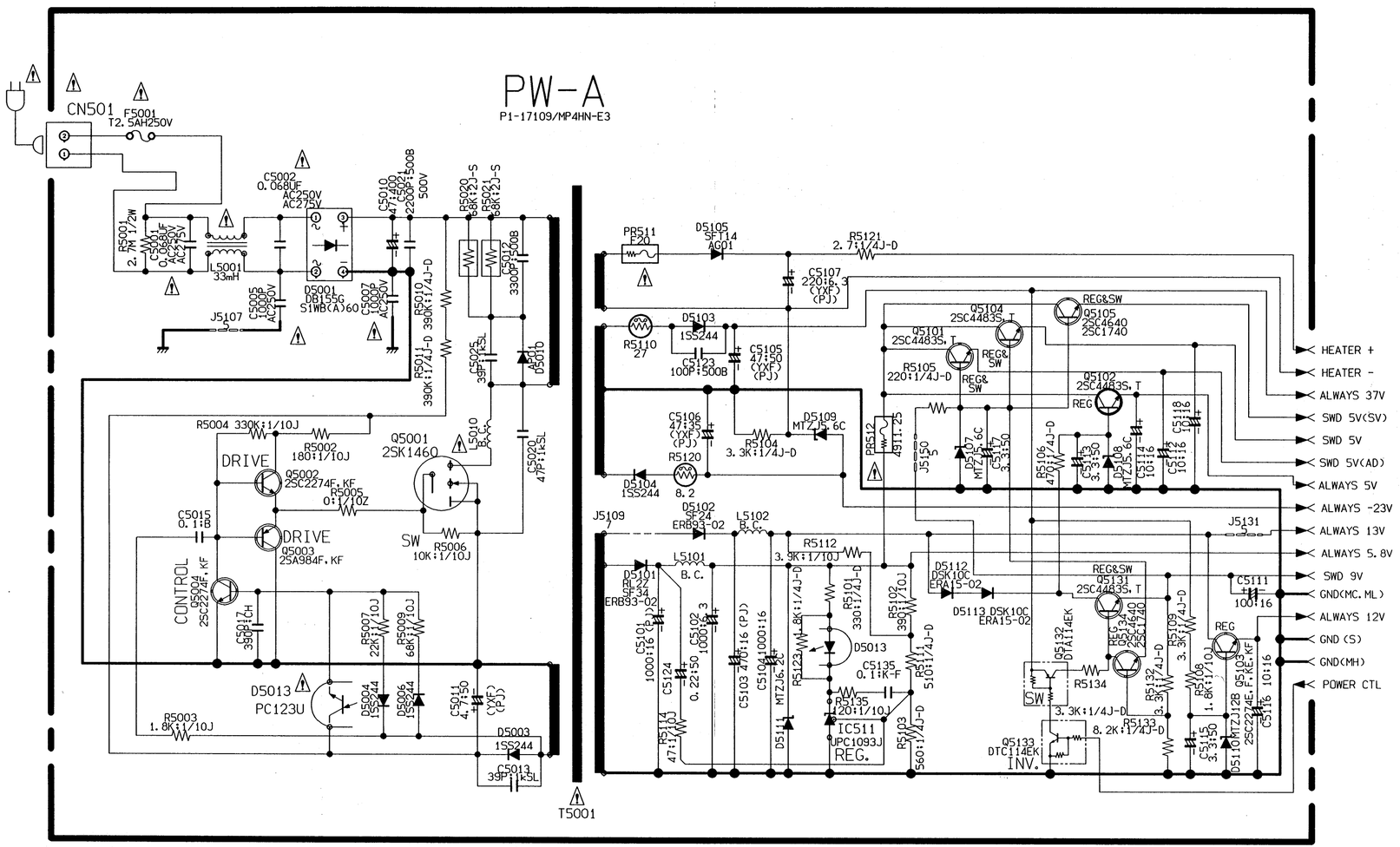
BDV1-17108/MP4HH-E2


IC301 MPU
SYSTEM CONTROL,
TIMER, TUNING CONTROL LC866852A
IC303
INITIALIZE RESET
IC302
LOADING MOTOR DRIVER
MECHANISM
LOADING MOTOR
MECHANISM MODE SWITCH
ROTARY SW
TAKE-UP REEL SENSOR
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
FL START SW/ ERASE PREVENTION SWITCH
OPERATION KEY-MATRIX
DISPLAY (FLD)
A7101 (TH-1 BOARD)
HEATER
GRID
SEGMENT
IR REMOTE CONTROL RECEIVER
3 IN 1 TUNER (TU/IF BLOCK)
IC304 E2P ROM
TM-9 (VPS/PDC)
IC632
IC831
TN-3
MTS DECODER
IC671
TN-5
NICAM DECODER
IC351 DIGITAL SERVO (BU2896K)
CTL HEAD
CAPSTAN MOTOR
HEAD DRUM MOTOR
MECHANISM
TO YA-A
TO SY-A
TO AD-A
ENV. SW (TO YA-A)
HEAD AMP SWITCHING (H.A SW) TO YA-A
8DS1-1T109/MP4HN-E3

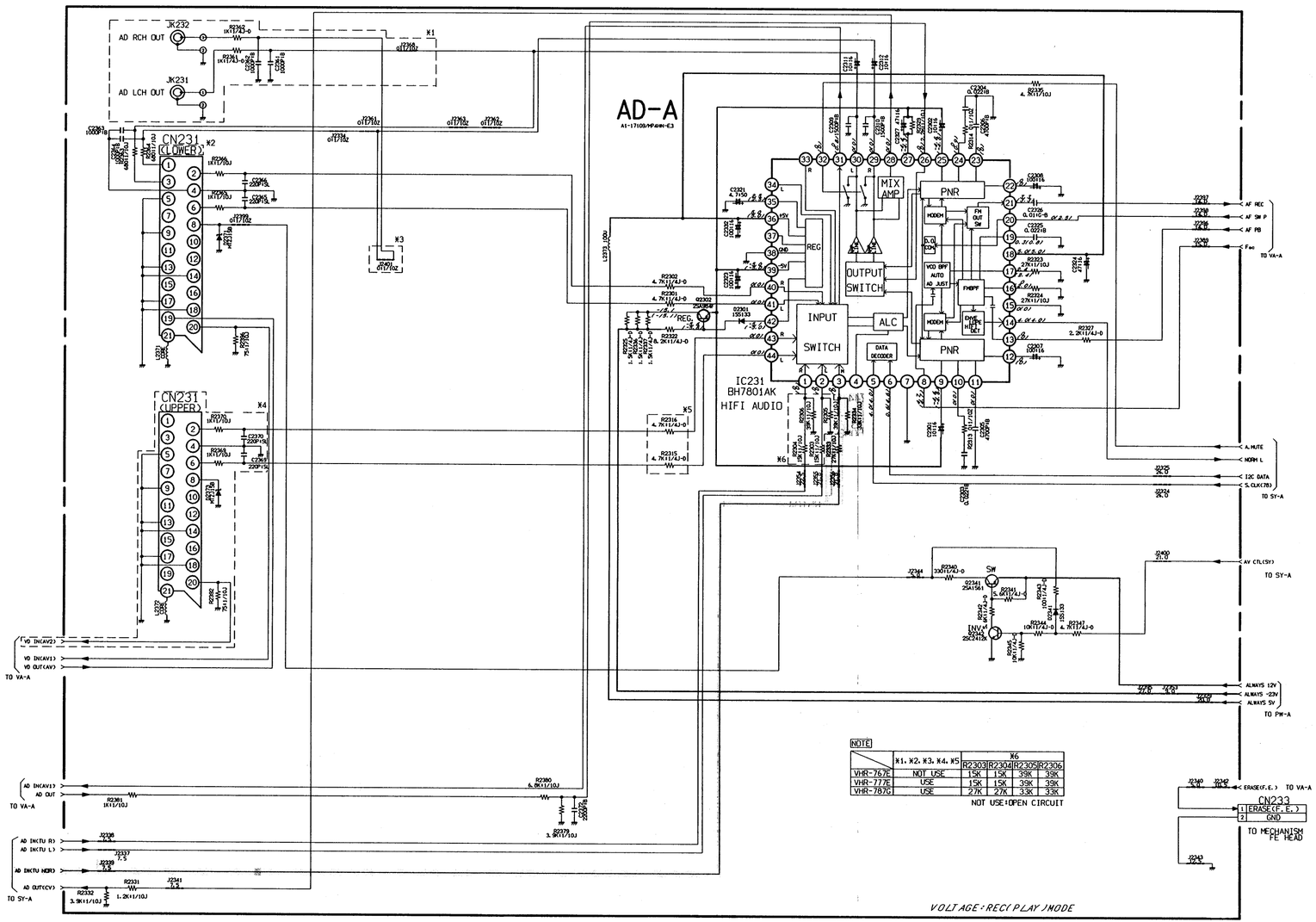
AUDIO CIRCUIT



CP-1 BOARD (PW-A) POWER SUPPLY



CP-1 BOARD (AD-A) HiFi AUDIO

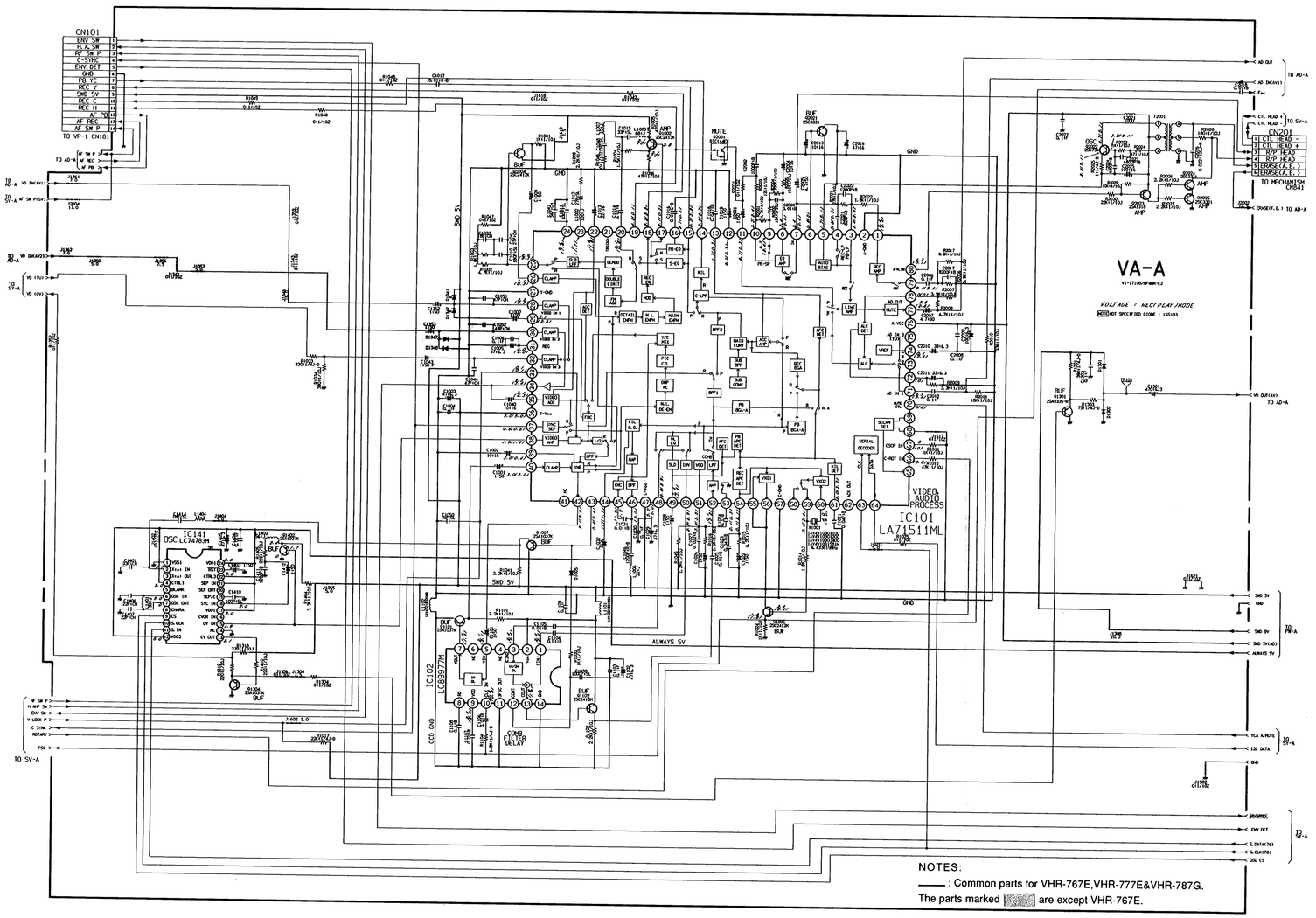


NOTE		X6			
	X1, X2, X3, X4, X5	R2303	R2304	R2305	R2306
VHR-767E	NOT USE	15K	15K	39K	39K
VHR-777E	USE	15K	15K	39K	39K
VHR-787G	USE	27K	27K	33K	33K

NOT USE:OPEN CIRCUIT

NOTES:
——— : Common parts for VHR-767E,VHR-777E&VHR-787G.
The parts marked [ ] are except VHR-787G.

CP-1 BOARD (VA-A) VIDEO & AUDIO

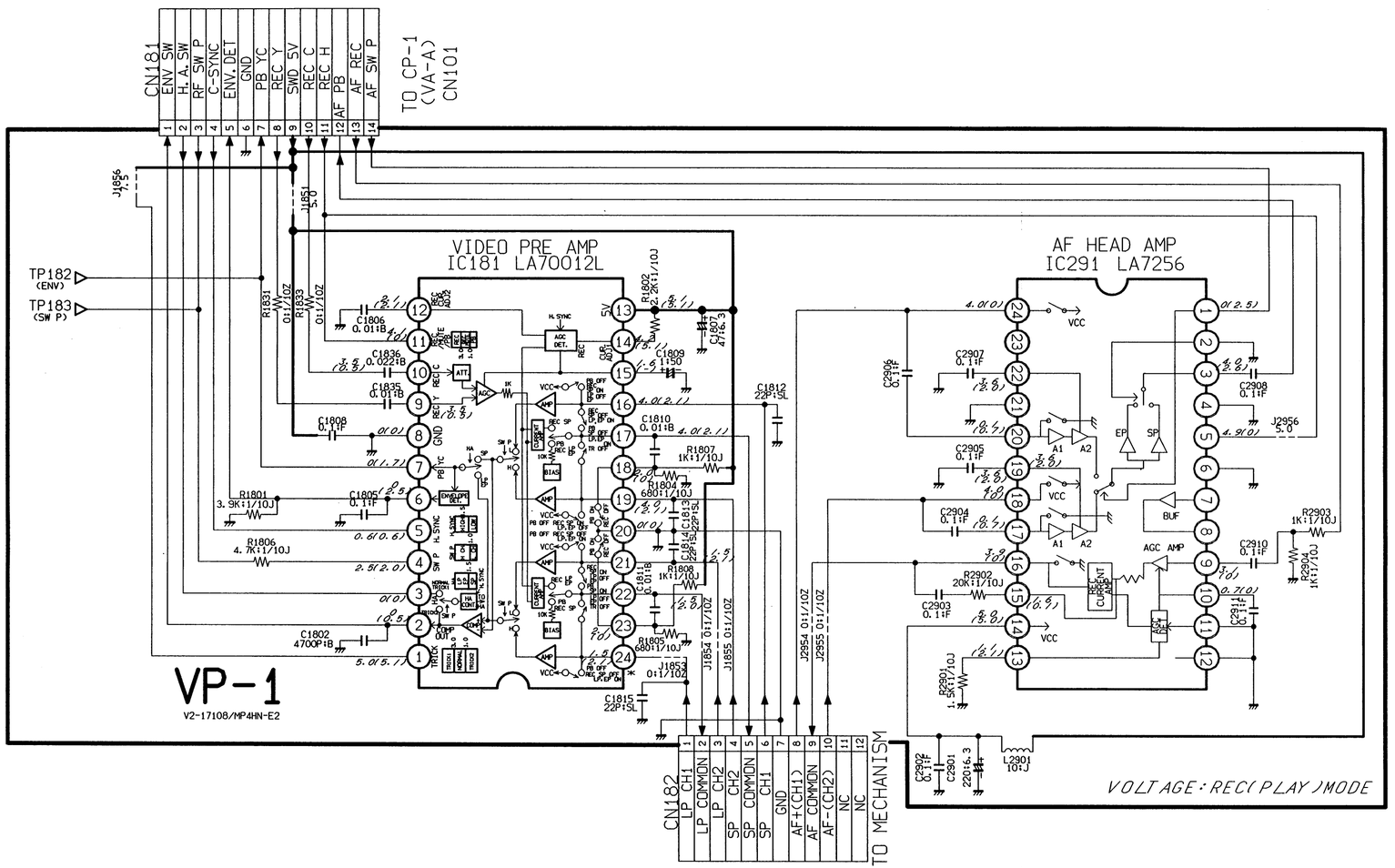


VIDEO CIRCUIT WAVEFORMS

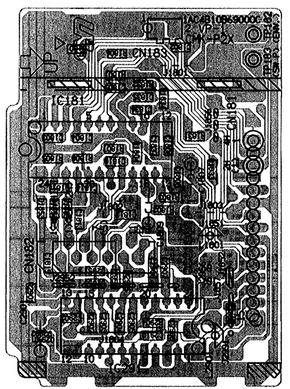
TEST LOCATION	WAVE FORM	TEST LOCATION	WAVE FORM
IC101 PIN14 REC 0.4Vp-p (REC C)		IC101 PIN37 REC, PLAY 4Vp-p (C SYNC)	
IC101 PIN15 PLAY 0.25Vp-p (PB Y, C)		IC101 PIN38 REC, PLAY 2Vp-p (VIDEO OUT)	
IC101 PIN18 REC 0.2Vp-p (REC Y)		IC101 PIN40, 42 REC, PLAY 0.35Vp-p	
IC101 PIN25, 26 REC, PLAY 0.5Vp-p		IC101 PIN45, 46 PLAY 0.4Vp-p	
IC101 PIN28 REC 1Vp-p (VIDEO IN)		IC101 PIN48, 50, 52 REC, PLAY 0.25Vp-p	

WF-V-PG2ZK

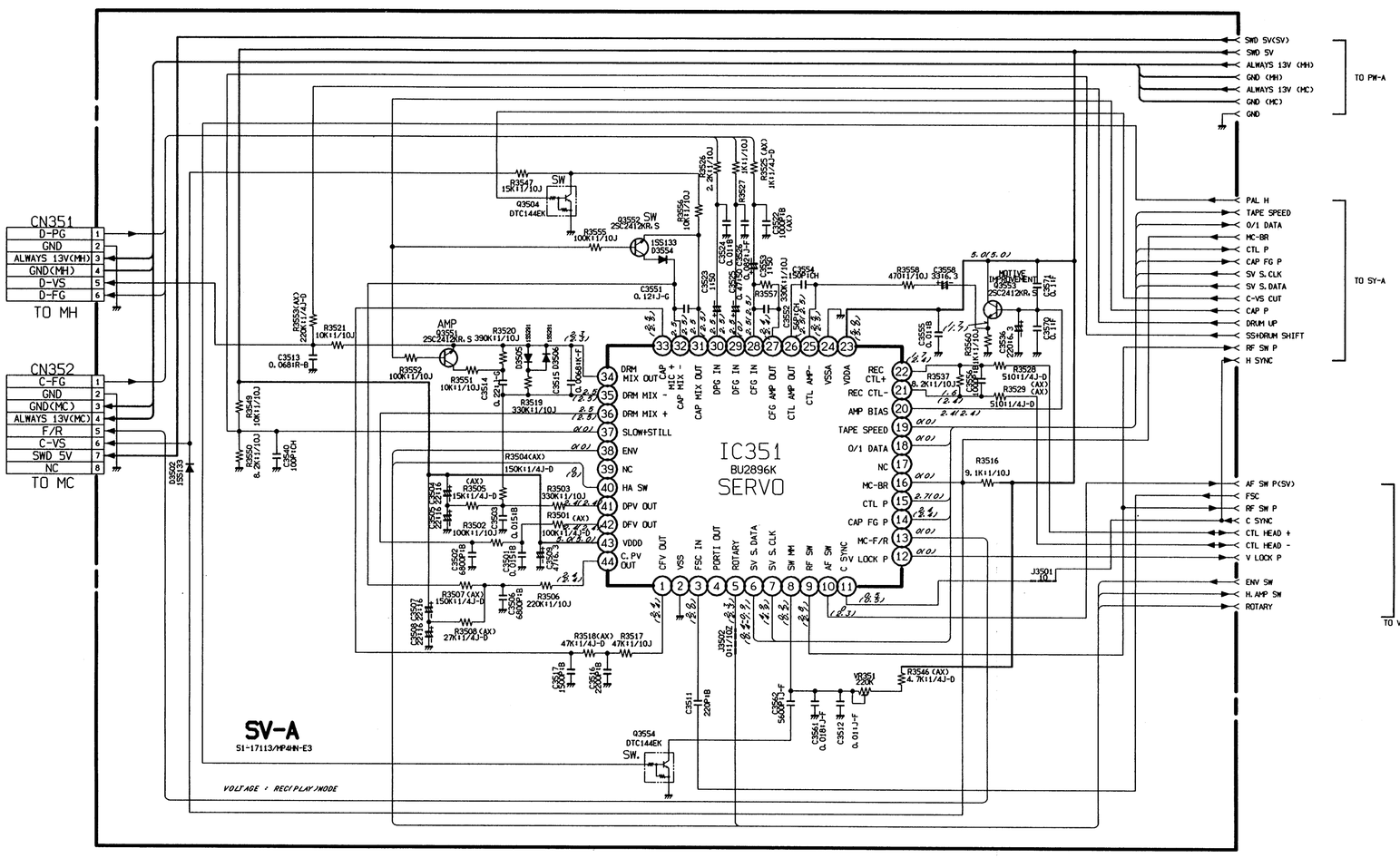
VP-1 BOARD VIDEO PRE-AMP



VP-1 P.W.B.



CP-1 BOARD (SV-A) SERVO

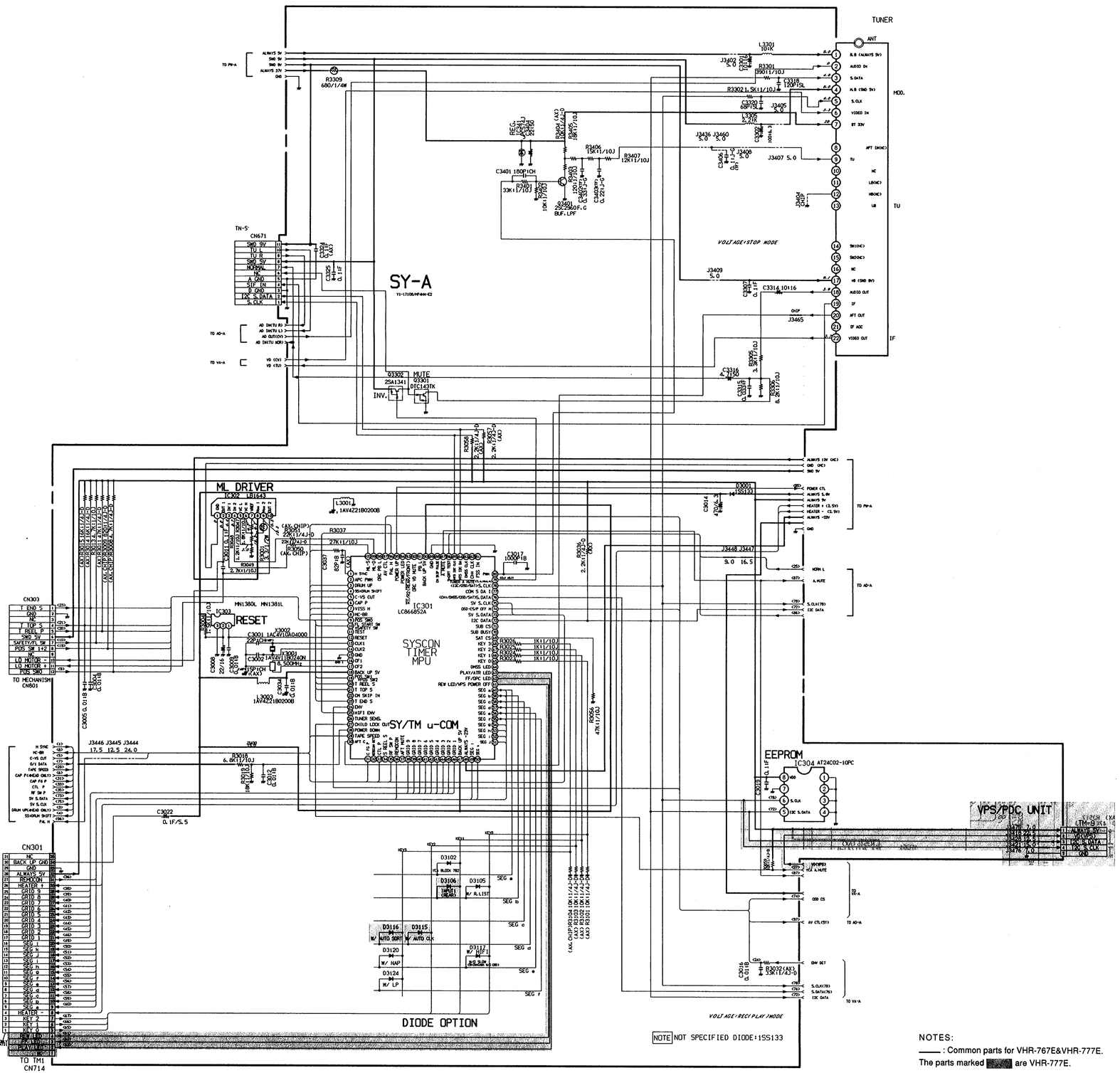


SERVO CIRCUIT WAVEFORMS

TEST LOCATION	WAVEFORM & MODE/LEVEL	TEST LOCATION	WAVEFORM & MODE/LEVEL
Pin 40 (H. A. SWITCHING)	SLOW PB 5.0V, 20msec 20msec	**Pin 15** (CTL PULSE)	REC 5.0V, 24msec 16msec
Pin 42 (PWM)	5.0V, 8.66KHz	**Pin 15** (CTL PULSE)	PB 850µsec, 5.0V, 40msec
Pin 41, 44, 1 (PWM)	5.0V, 69.27KHz	**Pin 21** (CTL HEAD-)	REC 3.6V, 1.4V, 24msec 16msec
Pin 3 (FSC INPUT)	0.3V, 4.43MHz	**Pin 22** (CTL HEAD+)	REC 1.4V, 3.6V, 24msec 16msec
Pin 5 (ROTARY)	PB 5.0V, 20msec 20msec	**Pin 26** (CTL AMP OUT)	PB 2.0V, 40msec
Pin 8 (D-PG MM)	2msec, 2.5V, 7msec	**Pin 28** (C-FG INPUT)	10mV, 1.32msec
Pin 9 (RF SW PULSE)	5.0V, 20msec 20msec	**Pin 29** (D-FG INPUT)	30mV, 1.33msec
Pin 10 (AF SW PULSE)	PB 5.0V, 20msec 20msec	**Pin 30** (D-PG INPUT)	250mV, 40msec
Pin 11 (COMPOSITE SYNC INPUT)	T=20msec, 4.2V	**Pin 38** (ENV. SW INPUT)	SLOW PB 4.0V, 20msec 20msec
Pin 14 (C-FG PULSE)	5.0V, 756.5Hz		

WF-S-PP

CP-1 BOARD (SY-A) SYSTEM CONTROL,TIMER & TUNER (VHR-767E,VHR-777E)



NOTES:

——: Common parts for VHR-767E&VHR-777E.

The parts marked ▩ are VHR-777E.

IC301 SYSTEM CONTROL,TIMER & TUNING CONTROL MPU PIN FUNCTIONS TABLE

No.	Name	I/O	H/L	I/O Signal Function
1	H SYNC	I	-	Sync. signal input for existing channel discrimination and TV system discrimination.
2	APC PWM	O	-	Signal to control video recording current EQ-amp.
3	DRUM UP	O	H	Head drum motor rotation speed up signal.
4	SS + DRUM SHIFT	O	-	Signal for indicating SLOW/STILL modes and alternation of drum motor control data. (3 value voltage)
5	C - Vs CUT	O	H	Cut off for capstan motor control voltage in SLOW / STILL modes.
6	CAP P.	O	H	Gain down control for Head Motor at SLOW mode.
7	VISS H	I	H	CTL pulse duty detection signal input. Used for VISS detection.
8	MC - BR	O	H	Brake signal for capstan motor.
9	POS SW0	I	L	Data indicating operation position of mechanism. (0V : SEARCH,STILL,SLOW,STOP,PLAY, and REC modes) (5V : EJECT,REW, and INITIAL modes)
10	FL- START + SAFETY SW	I	L	Switch input indicating start of cassette loading or discharge by cassette mechanism and detecting accidental erasure prevention tab of cassette tape.
11	-	-	-	-
12	RESET	I	L	Initial reset terminal for this IC.
13	CLK 1	-	-	Clock OSC during power failures.
14	CLK 2	-	-	Frequency is 32kHz.
15	VSS	-	-	Ground terminal
16	CF 1	-	-	IC clock OSC terminal.
17	CF 2	-	-	Frequency is 8.5MHz.
18	VDD	-	-	IC power supply terminal. (5Vdc)
19	POS SW1+2	I	-	Data indicating operation position of mechanism. (2V: EJECT,REW ,and INITIAL modes) (3.4V: STOP, PLAY,REC, and F-SEARCH modes) (2.5V: STILL and SLOW modes) (5V: R-SEARCH mode)
20	T. REEL S.	I	-	Pulse input for detection of take-up reel table rotation.
21	T. TOP S.	I	L	Sensor signal input for tape beginning detection.
22	CM SKIP IN	I	-	CM-DET signal input.
23	T. END S.	I	L	Sensor signal input for tape end detection.
24	ENV.	I	-	Video head envelope detection signal input for ATR function.
25	HiFi ENV.	I	-	Hi-Fi audio head envelope detection signal input for ATR function. (Hi-Fi model only)
26	TUNER SENS	-	-	NOT USE
27	YCA MUTE	O	H	Signal to disable audio signal output.
28	POWER DOWN	I	L	Power failure detection terminal.
29	TAPE SPEED	I	-	Input of result of tape speed discrimination by digital servo IC.
30	AFT - C	I	-	Tuner AFT S-curve signal input for tuner AFT control.
31	C - FG P.	I	-	FG signal input of capstan motor.
32	MESECAM DET	I	-	NOT USE
33	CTL P.	I	-	CTL head recording / playback pulse signal input.
34	S REEL P	I	-	NOT USE
35	RF SW P.	I	-	RF switching pulse input, created by head drum PG.
36	REMOCON	I	-	Remote control signal input.
37	AFT MUTE	O	H	"H" output during TU AFT mute. (V-syn model only)
38	G9	O	-	
39	G8	O	-	
40	G7	O	-	
41	G6	O	-	
42	G5	O	-	Display grid outputs (FLD).
43	G4	O	-	
44	G3	O	-	
45	G2	O	-	
46	G1	O	-	
47	VDD	-	-	IC power supply input.(5Vdc)
48	V LOAD	-	-	-23V input for FLD drive.
49	SEG i	O	-	
50	SEG k	O	-	
51	SEG j	O	-	Display segment outputs (FLD). (Includes key-scan output)
52	SEG i	O	-	
53	SEG h	O	-	
54	SEG g	O	-	
55	SEG f	O	-	
56	SEG e	O	-	
57	SEG d	O	-	Display segment outputs (FLD).
58	SEG c	O	-	(Includes key-scan output)
59	SEG b	O	-	
60	SEG a	O	-	
61	REW LED	O	H	Signal for indicating REW mode.
	VPS P OFF	O	H	Signal to disable power LED while OPC-DET is working.
62	FF/OPC LED	O	H	Signal for indicating FF or OPC mode.
63	PLAY/ATR LED	O	H	Signal for indicating PLAY or ATR mode.
64	DMSS LED	O	H	Signal for indicating DMSS mode.
65	KEY IN 0	I	-	
66	KEY IN 1	I	-	Operation key data inputs.
67	KEY IN 2	I	-	
68	KEY IN 3	I	-	
69	SAT CS	O	H	NOT USE
70	SUB BUSY	I	H	NOT USE
71	SUB CS	O	H	NOT USE
72	I2C S.DATA	I/O	-	Data exchange with I2C ROM, TUNER and video-audio IC.
73	SV S. DATA	O	-	Output 8-bit X 4 serial data giving operation mode and tracking data, etc., to digital servo IC.
74	OSD CS	O	H	Chip enable (access) signal output to OSD IC.
	POWER OFF MUTE	H	O	"H" output when power is off, for disable output signal.
75	SV S. CLK	O	-	The clock pulse for digital servo IC.(TUNER,VA-A)
76	COMMON DATA	O	-	Terminal for communication of respective data with OSD IC,DMSS IC,and CH+ IC.
77	COM S DA I	-	-	NOT USE
78	COMMON CLK	O	-	The clock pulse for TUNER, video-audio IC,OSD IC and E2P ROM.
79	TUNER A MUTE	O	H	Signal for disable the tuner audio signal.(HiFi set)
80	TU PWM	O	-	Tuning voltage output (PWM signal). (V-syn model)
81	FSS IN	I	-	CH+ mode control signal input (CH+ model).
82	CH PLUS CLK	O	-	The clock pulse for CH+ in/out-select IC.(CH+ model)
83	DMSS CLK	O	-	Clock signal for audio DMSS unit.
84	MTS ISC DA	I/O	-	NOT USE
85	MTS ISC CLK	O	-	NOT USE
86	SHORT TEST	I	I	REC mode indication signal input. (NOT USE)
87	A MUTE	O	H	"H" output for disable audio output signal.
88	CM SKIP PULSE	O	-	Pulse to sample-hold timing for CM-detector.
89	VSS	-	-	IC ground terminal.
90	VDD	-	-	IC power supply input.(5Vdc)
91	PB L	O	L	Signal for indicating playback mode.
92	ORC VD MUTE	O	H	"H" output for disable video output signal during detection of tape character.
93	R1/R2	O	-	Signal for selecting AV-input(video/audio)source.(R1:L)
94	POWER LED	-	-	NOT USE
95	POWER UP	O	H	"HIGH" output except when power is off. Indicating that power is ON.
96	PAL H	O	H	Signal to indicate "PAL" mode.
97	AV CTL	O	-	Audio input source selecting for audio IC.
98	ORC PB L	O	L	Signal to indicated "ORC PB" mode
99	ML- D	O	-	Loading motor rotation direction (FWD / REV) indication signal.
100	ML- S	O	-	Loading motor rotation speed (low / medium / high) indication signal.

MP_IC301

CP-1 BOARD (SY-A) SYSTEM CONTROL,TIMER & TUNER (VHR-787G ONLY)

SY-A

TUNER

MOD.

TU

IF

ML DRIVER

IC302 LB1641

IC301

SYSCON TIMER MPU

SY/TM u-COM

LC866852A

RESET

IC303

MN1380L MN1381L

EEPROM

IC304 AT24C04-10PC

VPS/PDC UNIT

TM-9

DIODE OPTION

VOLTAGE-STOP MODE

VOLTAGE-REC/PLAY MODE

TO MECHANISM CN801

TO SY-A

TO PW-A

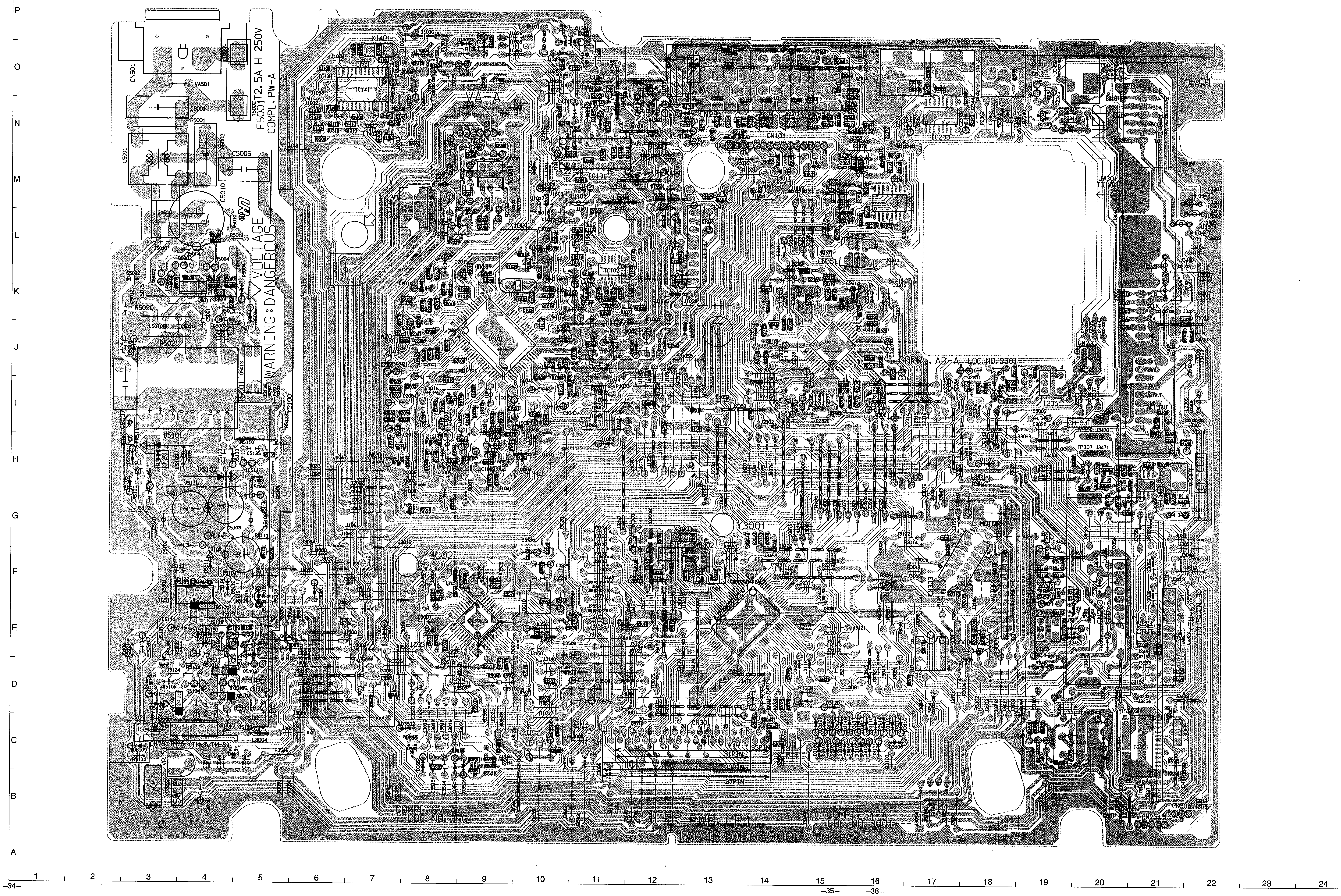
TO AD-A

TO VA-A

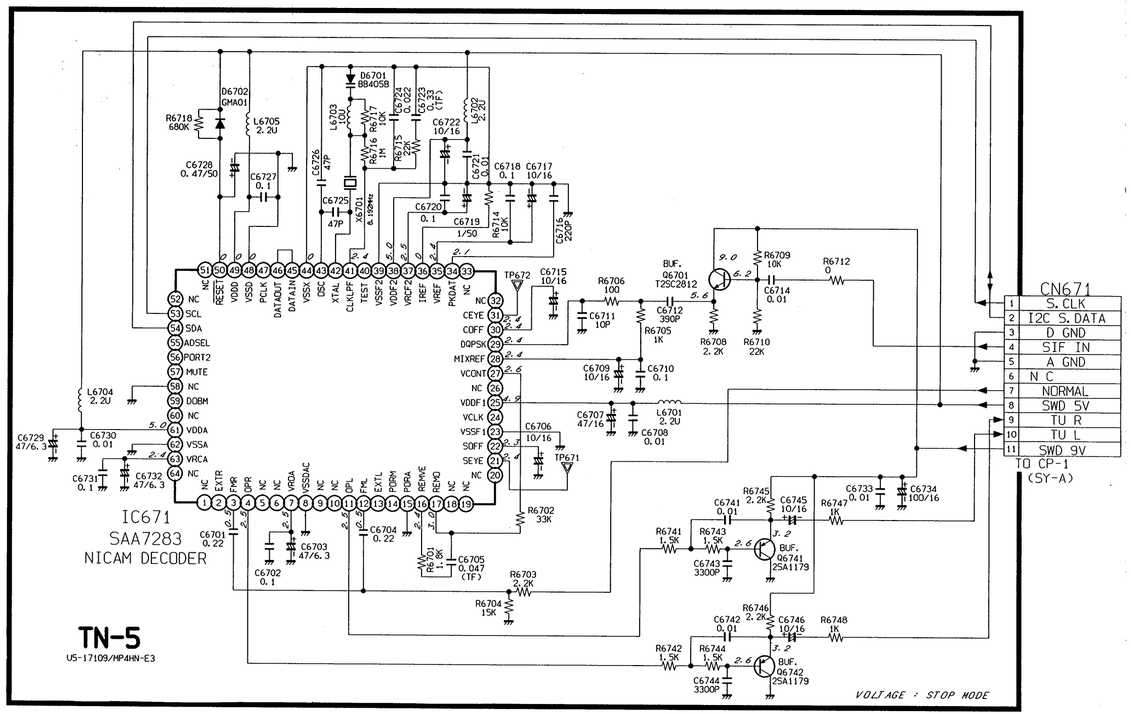
TO TM-1 CN711

NOTE NOT SPECIFIED DIODE:1SS133

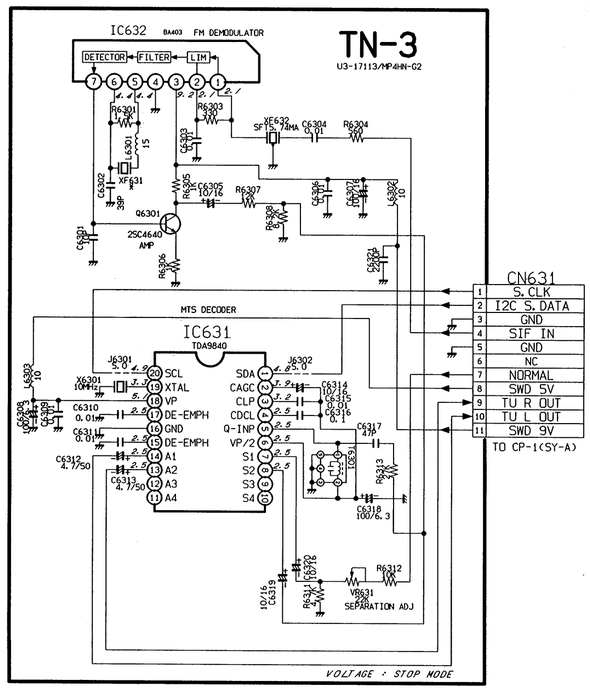
CP-1 P.W.B.


F5001 T2.5A H 250V
COMPL. PW-A
WARNING: DANGEROUS VOLTAGE
VA-A
COMPL. AD-A LOC. NO. 2301
COMPL. SV-A LOC. NO. 3501
COMPL. SY-A LOC. NO. 3001
P.W.B. CP-1
1AC4B10B68900C
CMK-P2X
CM-CUT
Y6001
Y3001
Y3002
IC101
IC102
IC131
IC141
IC231
IC232
IC233
IC301
IC302
IC304
IC305
IC351
IC512
CN101
CN201
CN231
CN233
CN234
CN301
CN303
CN305
CN351
CN352
CN501
CN781 TM-9 (TM-7, TM-8)
31PIN
33PIN
35PIN
37PIN
L MOTOR
MOTOR
T2351
T3451
VR301
VR351
SW P

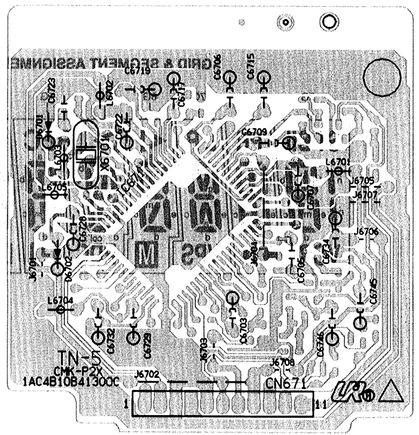
TM-5 BOARD NICAM DECODER (VHR-767E,VHR-777E)



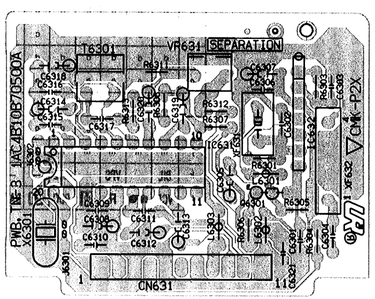
TN-3 BOARD MTS DECODER (VHR-787G)



TN-5 P.W.B. (VHR-767E,VHR-777E)

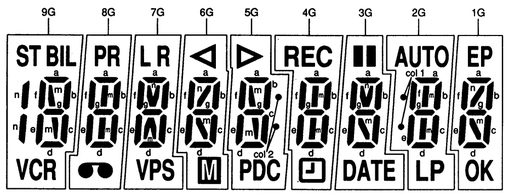


TN-3 P.W.B. (VHR-787G)



A7101 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE

GRID & SEGMENT ASSIGNMENT

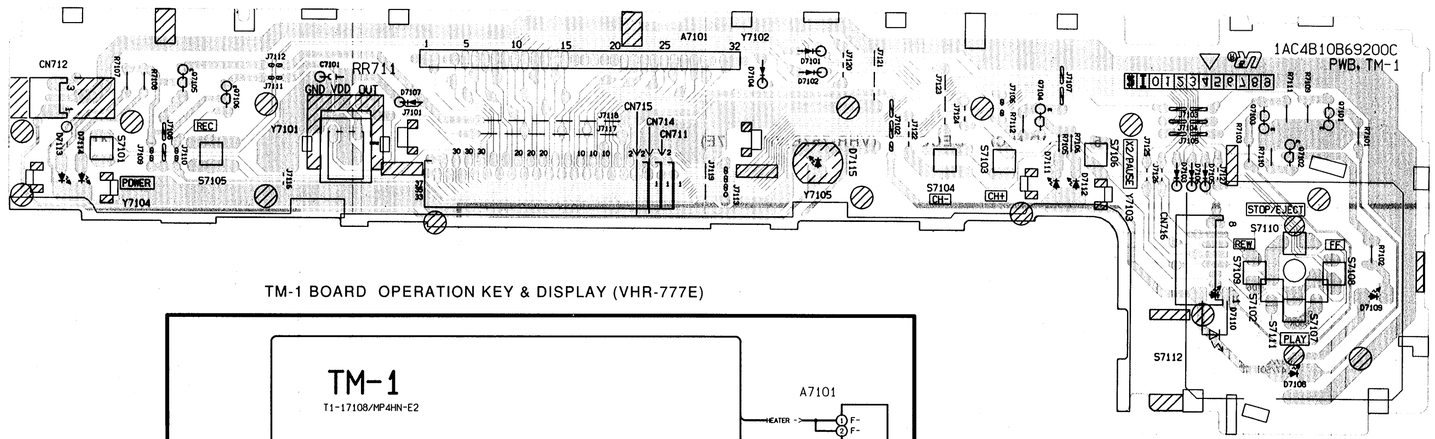


ANODE CONNECTION

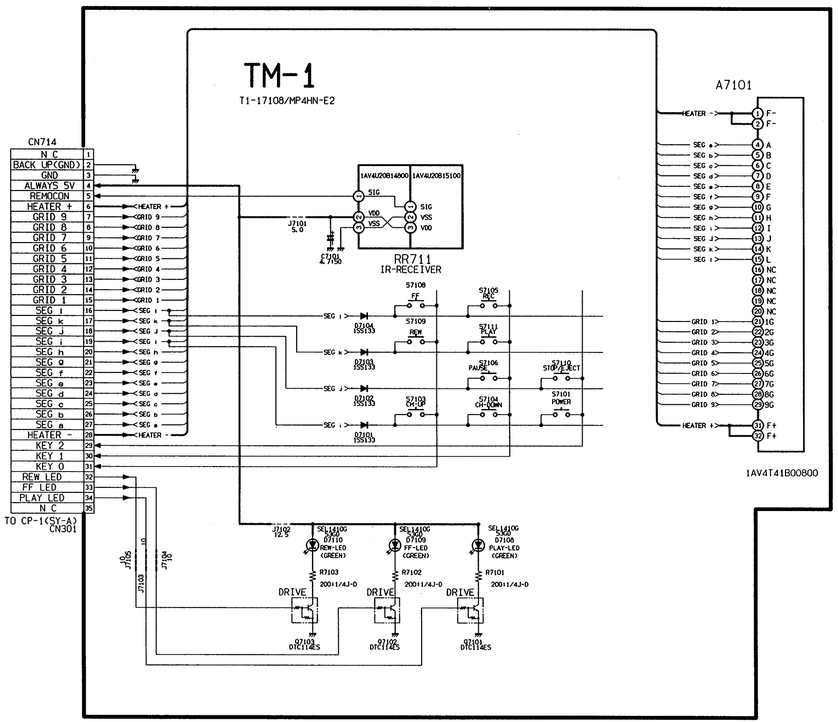
GRID / SEGMENT	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	ST	PR	L	◁	▷	REC	❚❚	AUTO	EP
b	n	—	n	n	—	—	n	—	n
c	a	a	a	a	a	a	a	a	a
d	b	b	b	b	b	b	b	b	b
e	c	c	c	c	c	c	c	c	c
f	d	d	d	d	d	d	d	d	d
g	e	e	e	e	e	e	e	e	e
h	f	f	f	f	f	f	f	f	f
i	g	g	g	g	g	g	g	g	g
j	m	m	m	m	m	m	m	m	m
k	BIL	—	VPS	—	col 2	—	—	col 1	—
l	VCR	∞	R	M	PDC	⏎	DATE	LP	OK

GR-00800

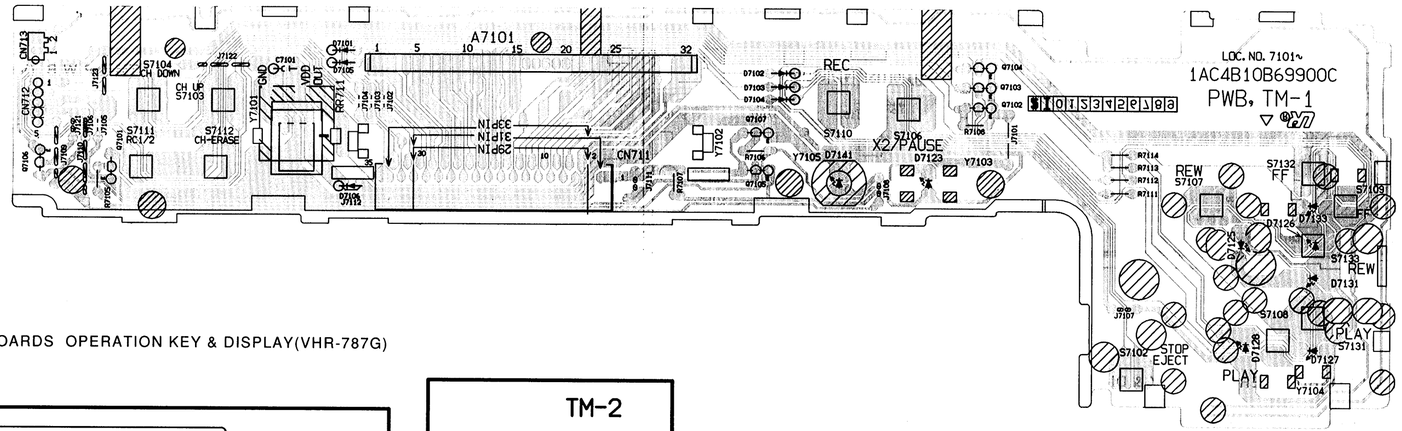
TM-1 P.W.B. (VHR-777E)



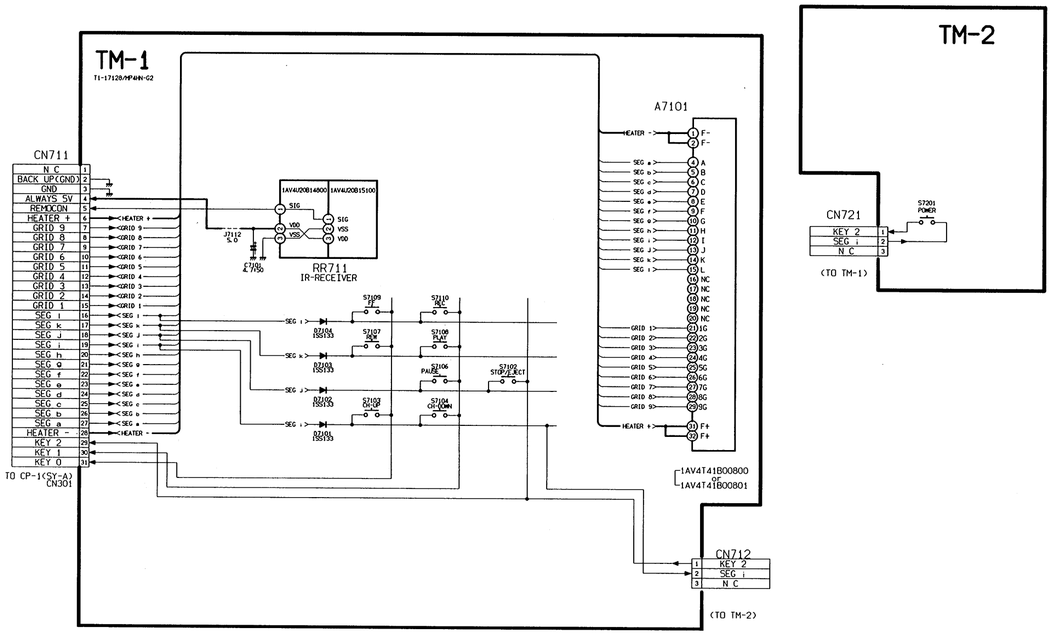
TM-1 BOARD OPERATION KEY & DISPLAY (VHR-777E)



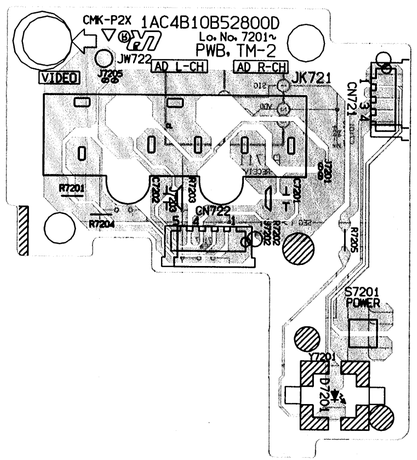
TM-1 P.W.B. (VHR-787G)



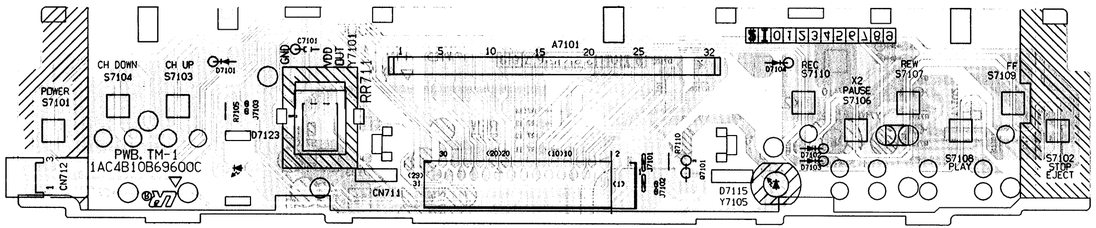
TM-1,TM-2 BOARDS OPERATION KEY & DISPLAY(VHR-787G)



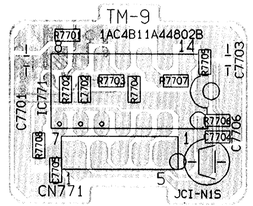
TM-2 P.W.B. (VHR-787G)



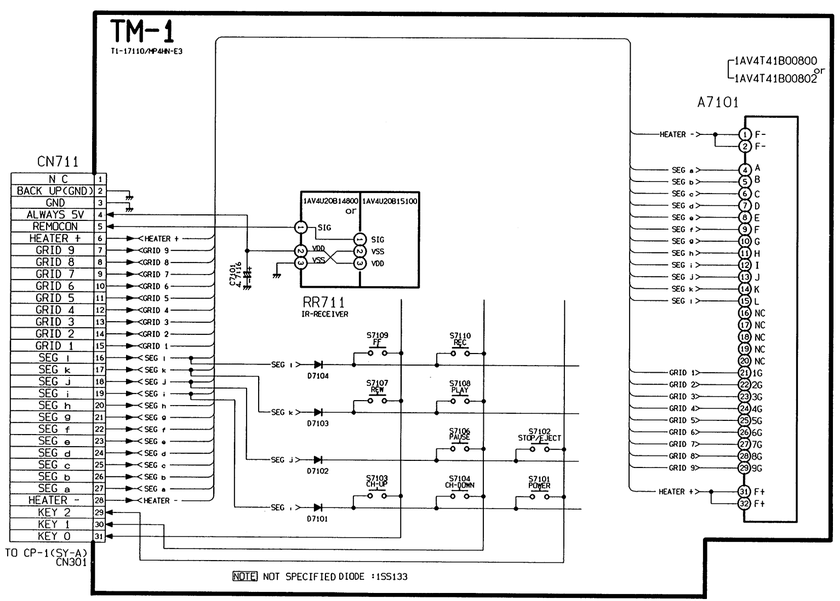
TM-1 P.W.B. (VHR-767E)



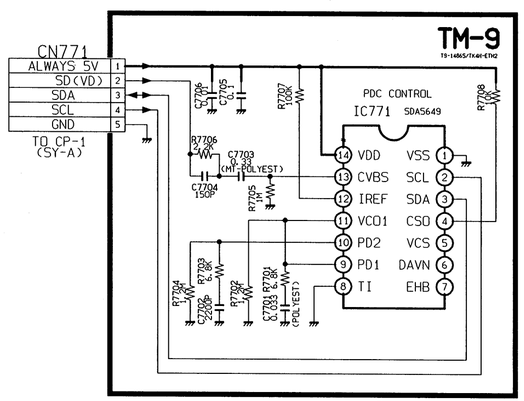
TM-9 P.W.B. (VHR-787G,VHR-777E)



TM-1 BOARD OPERATION KEY & DISPLAY (VHR-767E)



TM-9 BOARD PDC/VPS (VHR-787G,VHR-777E)



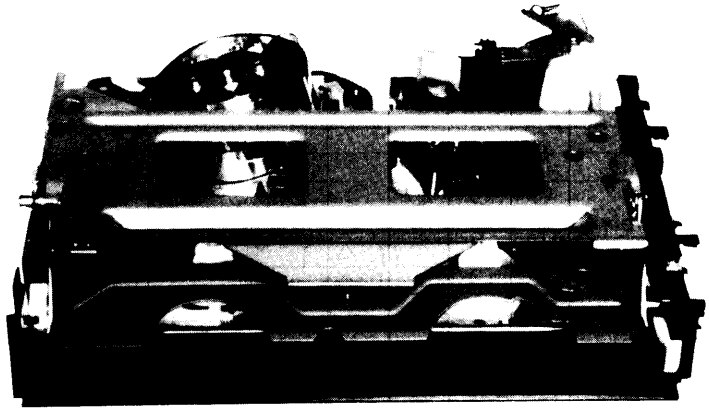
FILE NO.

SANYO

BASIC SERVICE TECHNICAL INFORMATION

Video Cassette Recorder

V95 T MECHANISM



VHS
PAL SECAM NTSC

Contents

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REFERENCE No.MM541172

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○Cleaning ◎Check △Oil □Check, Replace

Part maintained \ Hours of use (H)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape path system	Band brake assembly		◎				□				◎	
	BT lever assembly	○	○	○	○	○	○	○	○	○	○	
	Full erase head	○	○	○	○	○	□	○	○	○	○	
	Cleaner roller assembly		◎		◎		□		◎		◎□	
	Guide roller assembly	○	○	○	○	○	○	○	○	○	○	
	S incline mounting assembly	○	○	○	○	○	○	○	○	○	○	
	T incline mounting assembly	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	□	○	○	○	○	
	Pinch roller lever assembly	○	○	○	○	○	□	○	□	○	○	
	Pinch lift mounting										□	
	Pinch lift cam										□	
	Pinch cam gear										□	
	Cylinder earth assembly								□			
	Cylinder complete	○	○	○	○	○	○	○	○	○	○(□)	
	Upper cylinder assembly	○	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	
Reel drive system	Supply reel assembly		○		○△		○		○△		○	
	Take up reel assembly		○		○△		○		○△		○	
	S reel gear		△		△		△		△		△	
	T reel gear		△		△		△		△		△	
	Reel pulley		△		△		△		△		△	
	Special washer 2.4 x 6 x 0.25						◎				◎	
	Clutch mounting complete		△		△		△		△		△	
	Reel belt				□				□			
	Capstan motor	○	○	○	○	○	○	○	○	○	□	
	Friction gear assembly				△				△□			
Brake system	S brake assembly		◎		◎		◎		◎		◎	
	T brake assembly		◎		◎		◎		◎		◎	
	Capstan brake assembly		◎		◎		◎		◎		◎	
	T soft brake assembly		◎		◎		◎		◎		□	
Loading drive system	Loading motor assembly		◎		◎		◎		◎		□	
	Damper				◎						□	
	Worm gear complete				◎						□	
	Main cam				◎						□	
	Special washer 3.6 x 0.5				◎						□	
	Wheel gear 1				◎						□	
	Wheel gear 2				◎						□	
	Mode switch				◎						□	
	Crescent slide				◎						□	
	S load gear				◎						□	
	Front rack gear				◎						□	
	Rack gear				◎						□	
	Pinion gear				◎						□	
Perform-ance checks	Back tension torque		◎		◎		◎		◎		◎	PB back tension torque: 30~50g/cm
	FF, REW torque		◎		◎		◎		◎		◎	FF, REW: more than 600g•cm
	PLAY torque		◎		◎		◎		◎		◎	PLAY (8h): 55~110g•cm
	REV torque		◎		◎		◎		◎		◎	REV: 110~210g•cm

This periodic maintenance check table changes considerably according to the using conditions and environment.
Refer to POWER ON TIME, HEAD ON TIME for the length of time the unit has been used.
As life may be shortened if foreign particles and dusts remain accumulated on the tape guides and rotating and contacting portions, clean if dirty.
Dusts and other foreign particles on the tape guides may also shorten the tape life and lower picture quality, therefore clean thoroughly.

1-2. SERVICE TOOLS AND CLEANING

1-2-1. SERVICE TOOLS

NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.		Remarks
		NTSC	PAL	
1	Alignment tape	VHJ-0005	VHJ-0008	SP colour bar 1kHz (normal)
2	Alignment tape	VHJ-0006	VHJ-0009	SP monoscope 7kHz (normal)
3	Alignment tape	VHJ-0007	———	EP monoscope
4	Alignment tape	———	VHJ-0052	LP monoscope
5	Alignment tape	VSJ-1001	———	EP mode 3kHz (normal)
6	Eccentric screw driver	VHJ-0003		Used to adjust the tape path
7	Nut box	VHJ-0048		Used to adjust the height of the lever load assembly
8	Torque dial gauge	VHJ-0004		Used to measure reel winding torque
9	Cassette torque meter	VHJ-0016		Used to measure back tension torque
10	Load lever assembly height adjustment tool	VHJ-0111		Used to adjust the height of the load lever assembly
11	Torque gauge screwdriver	VHJ-0014		Used to adjust the tightening torque of screws
12	3 mm dia. bit for torque screwdriver	VHJ-0045		Used to replace the bit of the torque gauge screwdriver
13	Video head removing tool	VHJ-0041		Used to remove the upper cylinder
14	Oil	VHJ-0099		
15	Grease	VHJ-0100		
16	Grease	VHJ-0101		
17	Relay cables	VHJ-0110		Relay cables of mechanism and CP-1 PWB assembly

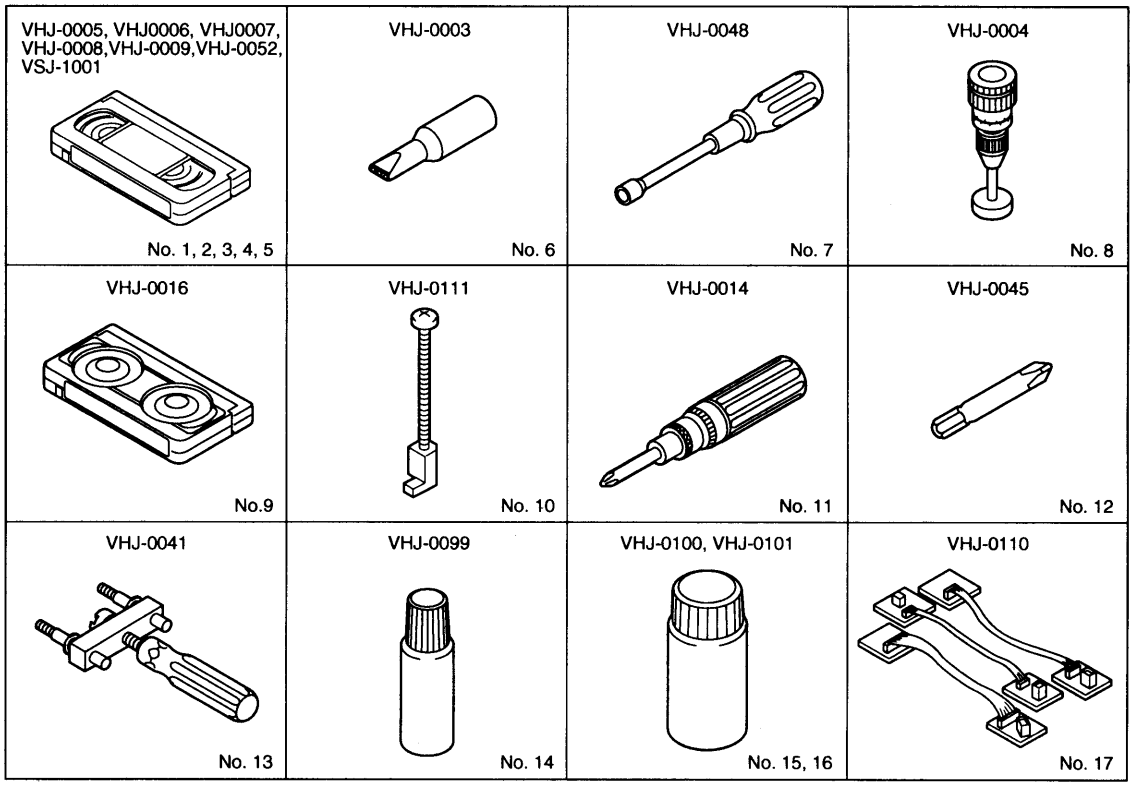


Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0106)

The mechanism can be repaired without using the relay cable (VHJ-0110). As shown in Fig. 1-2-2, the relay cable (VHJ-0110) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-2-2 when inserting/ejecting the cassette.

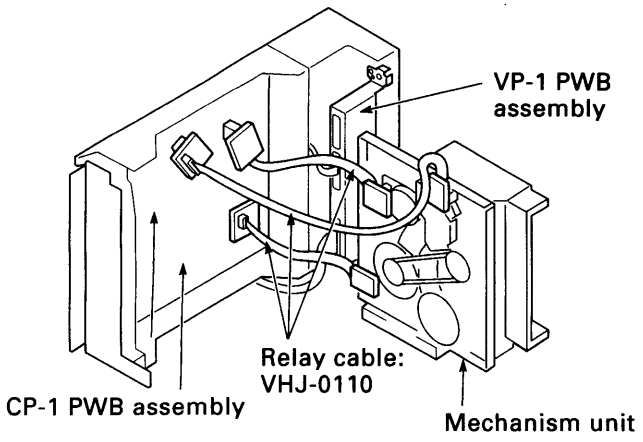


Fig. 1-2-2

1-2-3. CLEANING

1. Cylinder (Drum) (See Fig.1-2-3)

Moisten a chamois with methyl alcohol and clean the video head and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

NOTE: If the dirt on the tape guide cannot be cleaned off, replace the tape guide.

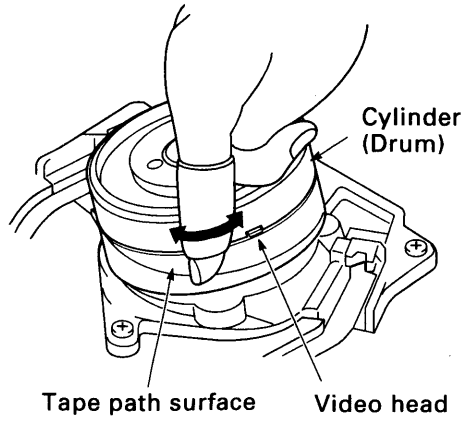


Fig.1-2-3

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

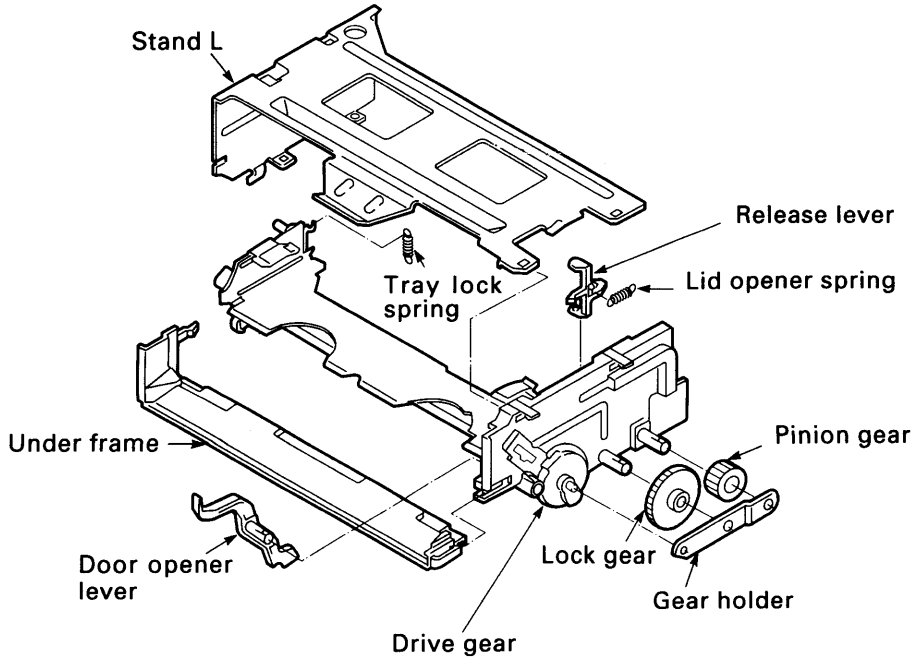


Fig. 2-1-1

2-1-2. TOPVIEW

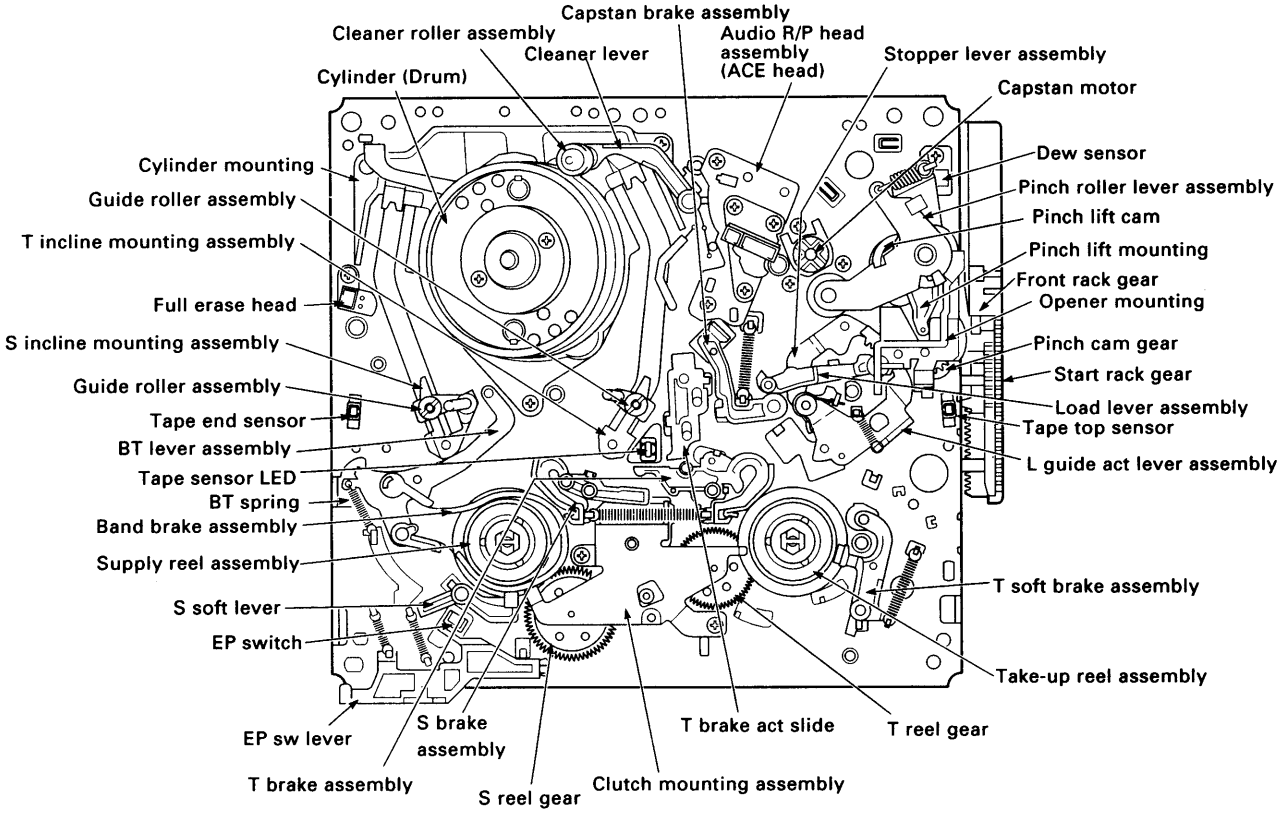


Fig. 2-1-2

2-1-3. UNDERSIDE

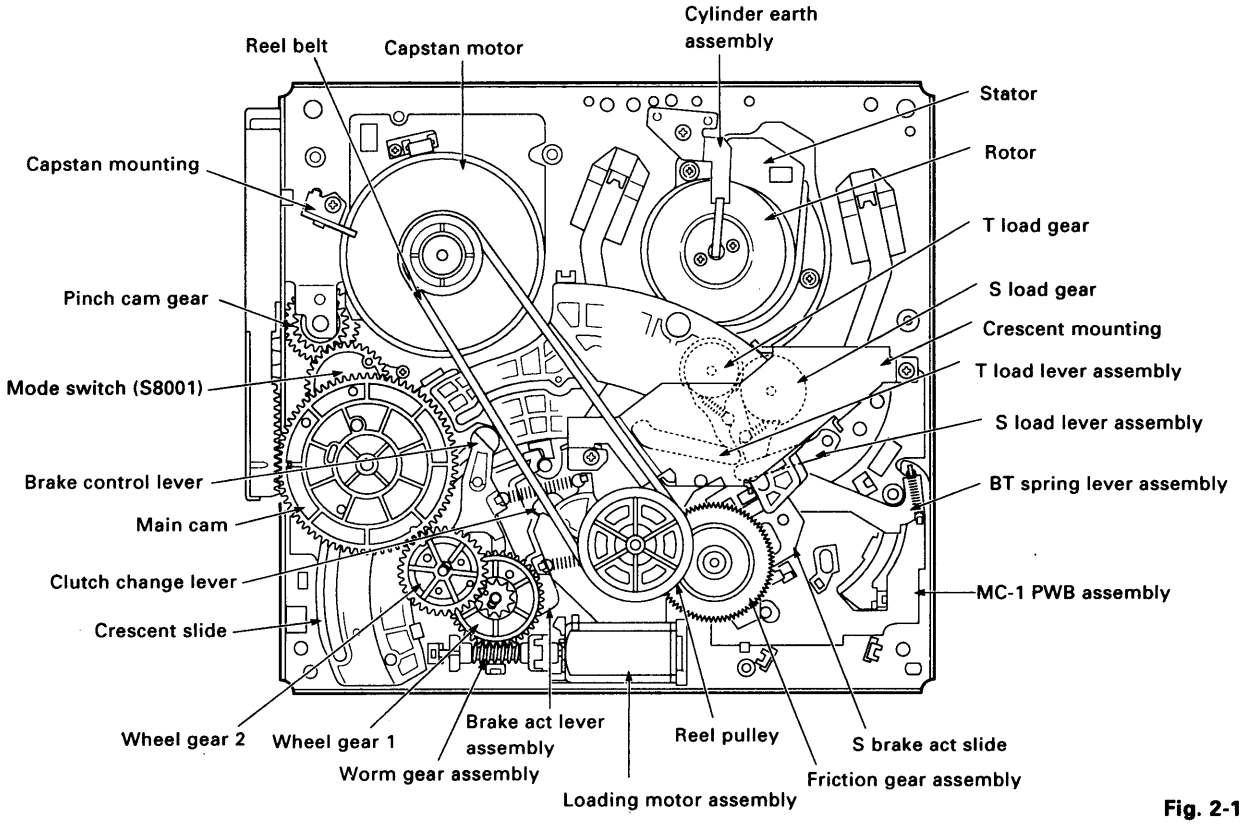


Fig. 2-1-3

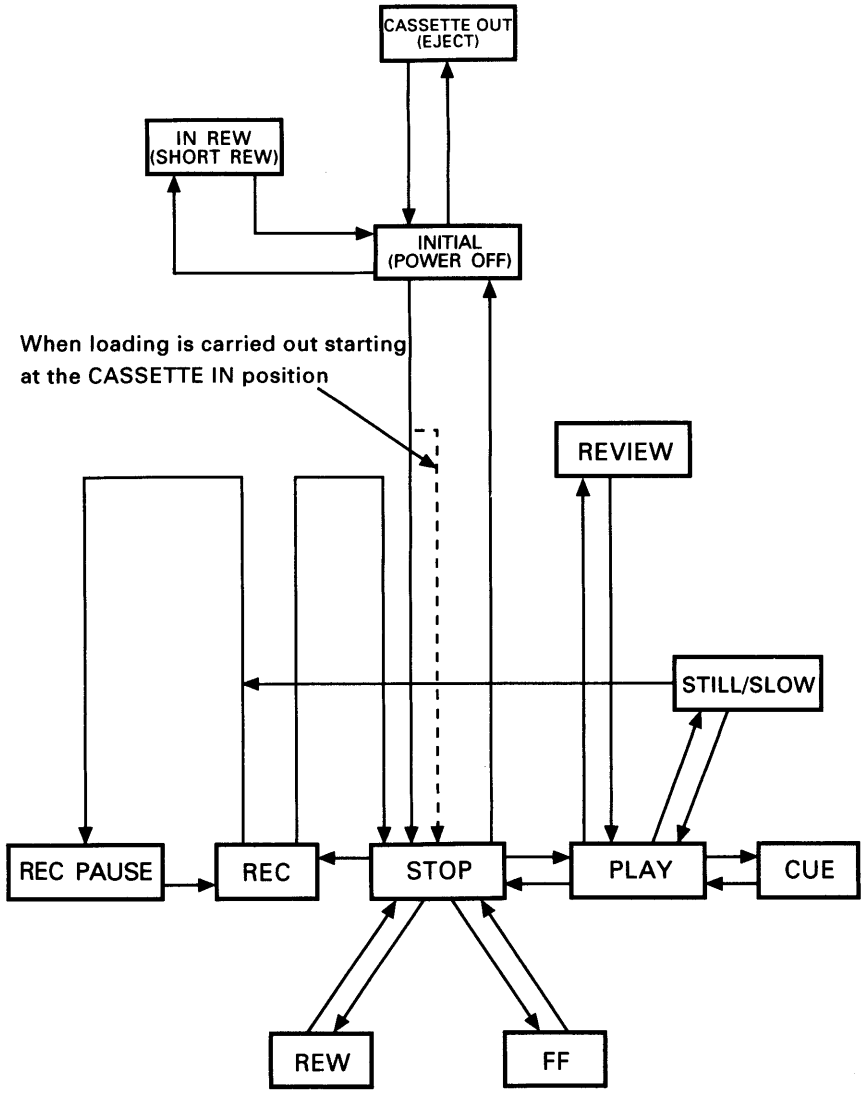
2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.
2	IN REW Ⓡ
0	
7	INITIAL ⑦
0	Cleaner roller assembly: ON
1	S/T mounting incline assembly pressure begins.
0	S/T mounting incline assembly pressure ends.
1	REVIEW ①
0	IDLER pos. ② (Pinch roller OFF)
2	
0	
3	STILL/SLOW ③
0	
5	PLAY/STOP ⑤
0	
4	BRAKE pos. ④
0	
6	FF/REW ⑥

The principal mode-switching states of the mechanism



MODE SWITCH OUTPUT TABLE

HEX DATA	X	Y	Z
0	H	H	H
1	H	H	L
2	H	L	H
3	H	L	L
4	L	H	H
5	L	H	L
6	L	L	H
7	L	L	L

X: SW DATA 2
Y: SW DATA 1
Z: SW DATA 0

H: 5V
L: 0V
Low active

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

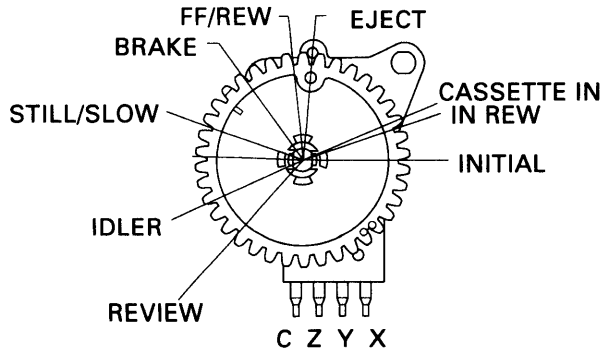


Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Principal parts \ Mechanism mode	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.
Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

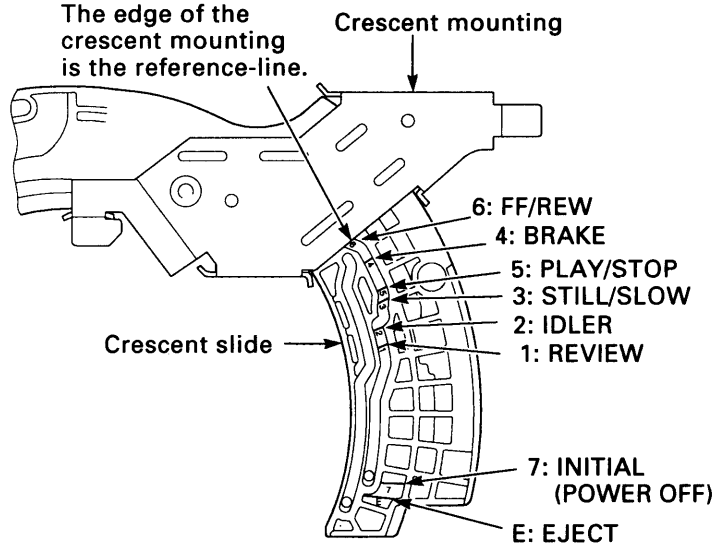


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.
Use it as a means of finding out the symptoms and cause of the error before performing repairs.
For details, refer to the separate service manual for the respective models.

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of dis-assembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-2.

3-1-1. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-1)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
   When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

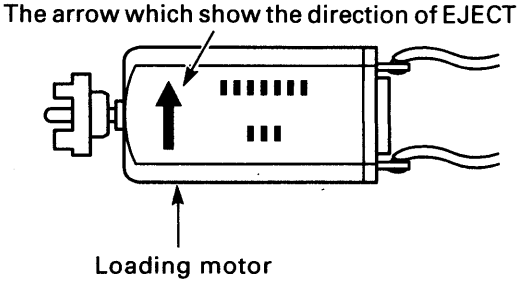


Fig.3-1-1

3-1-2. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) If you turn the main cam counterclockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

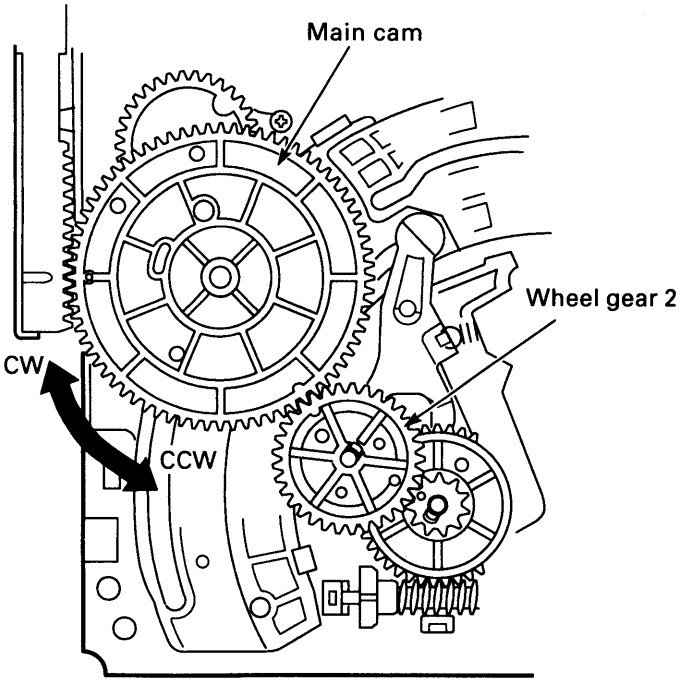


Fig.3-1-2

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ②.
3) Unplug the dew sensor connector ⑩.
4) Remove the two screws ③, then remove the VM-1/VP-1 PWB assembly ④, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly varies according to the model.
5) Remove the two screws ⑤ and the two screws ⑥, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑤ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

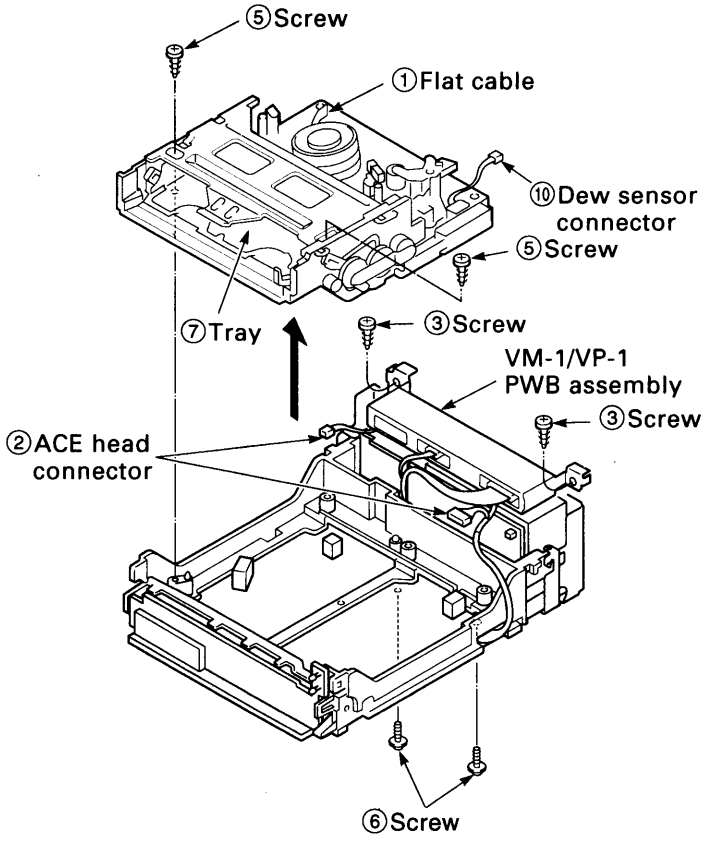


Fig.3-2-1

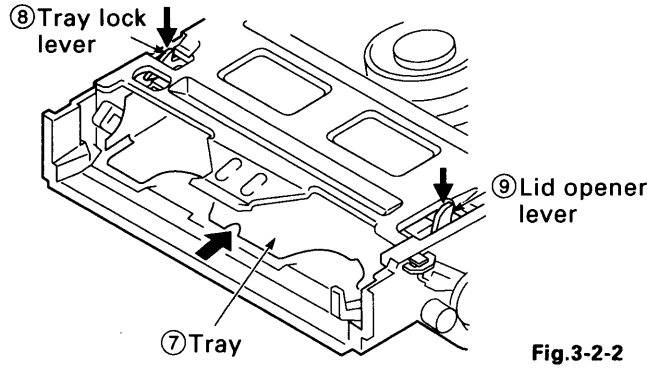


Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

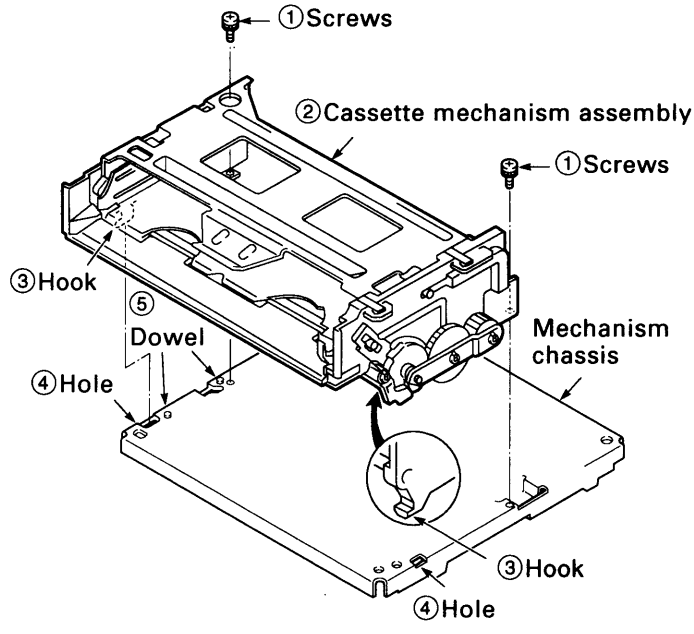


Fig.3-3-1

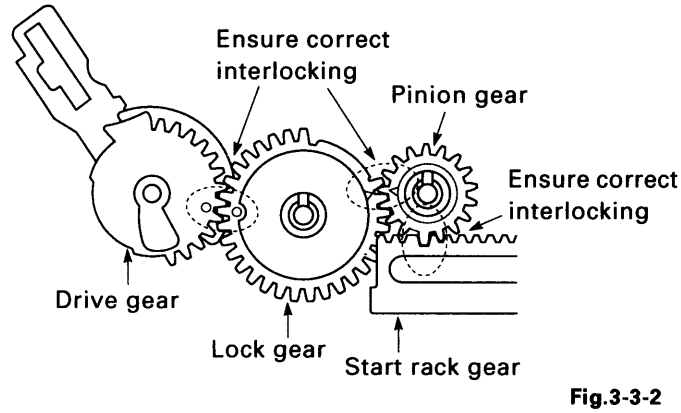


Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

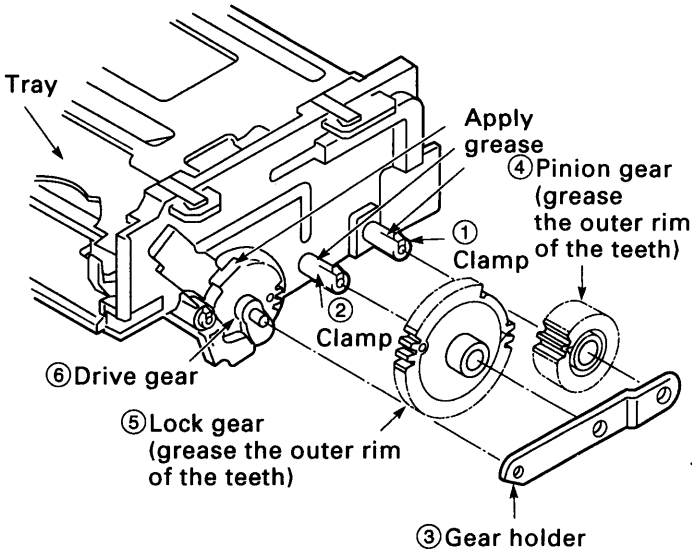


Fig.3-3-3

3-3-3. DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

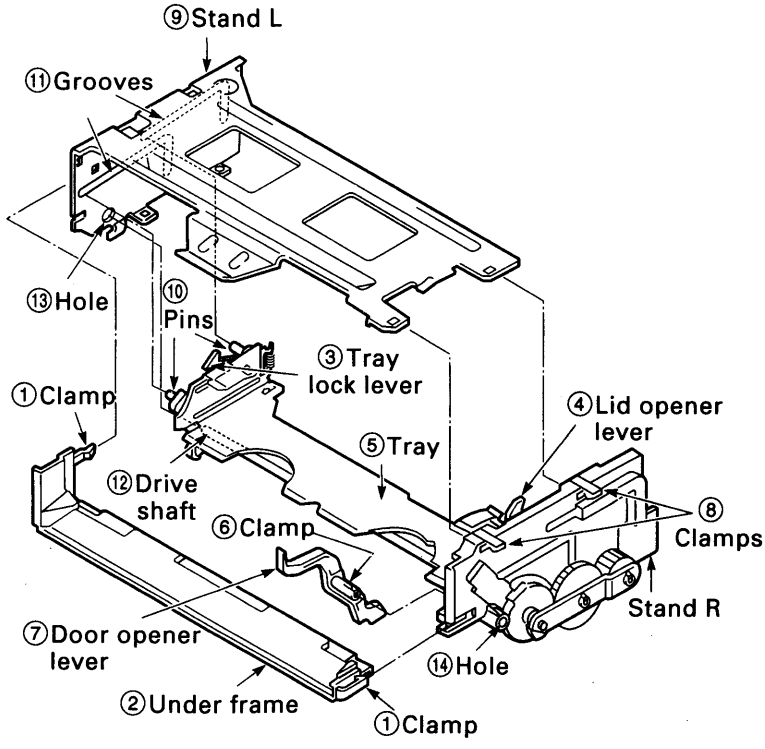


Fig.3-3-4

3-3-4. START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

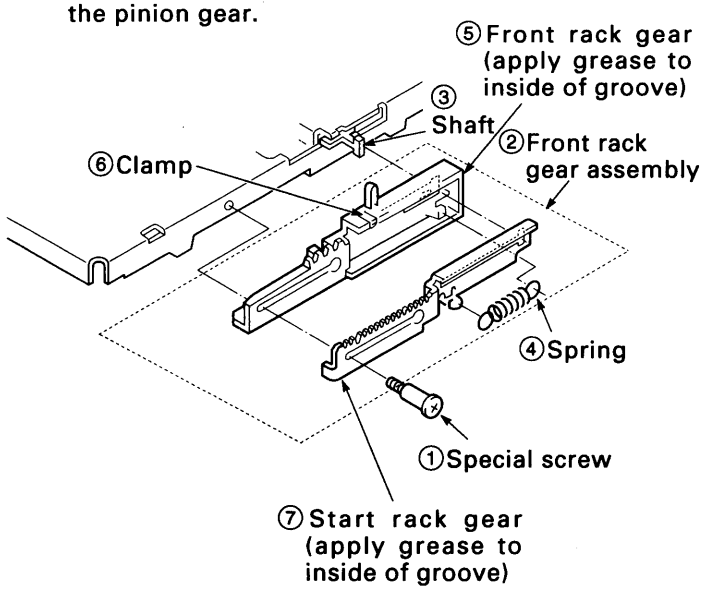


Fig.3-3-5

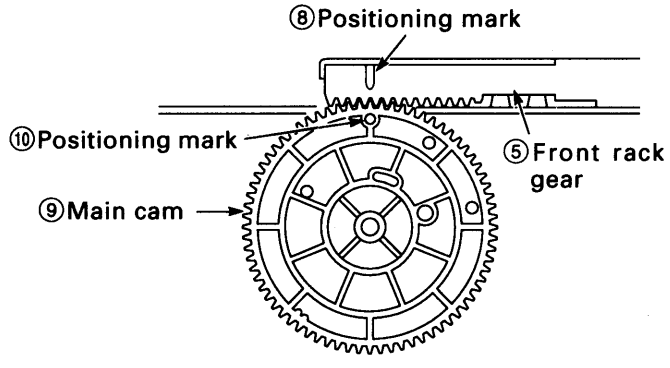


Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑon the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

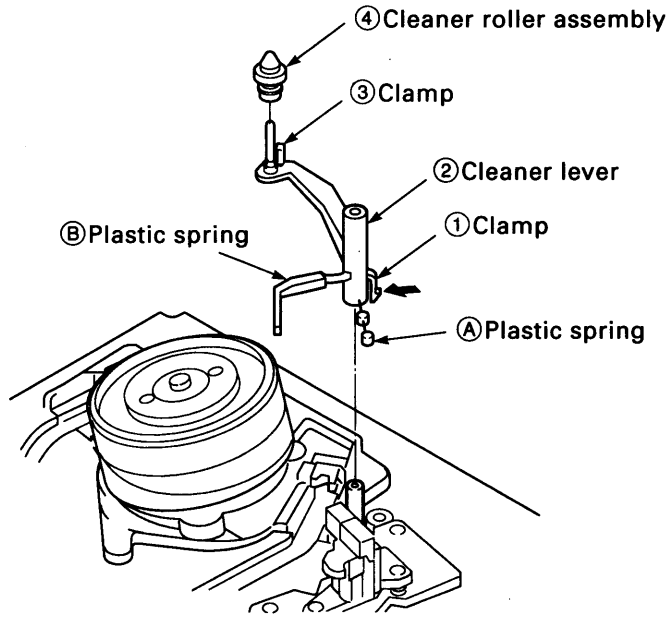


Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM) (See Figs. 3-5-1, 3-5-2, 3-5-3,3-5-4)

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle ② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

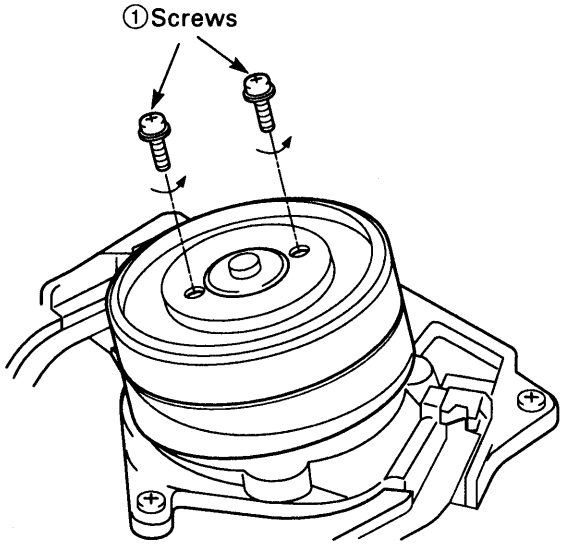


Fig.3-5-1

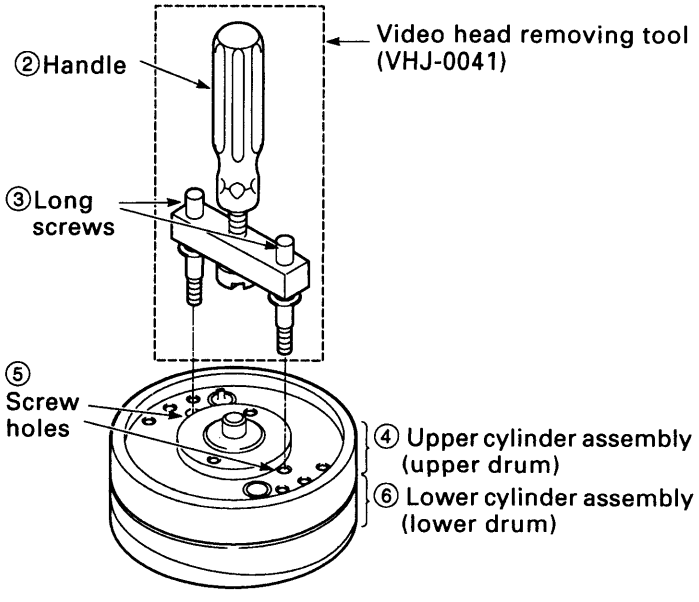


Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N4N-Q, 2N4P-QO, 2N4N-QL, 2N4P-QL, 2N4N-SQ, 2N4P-SQ...etc, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

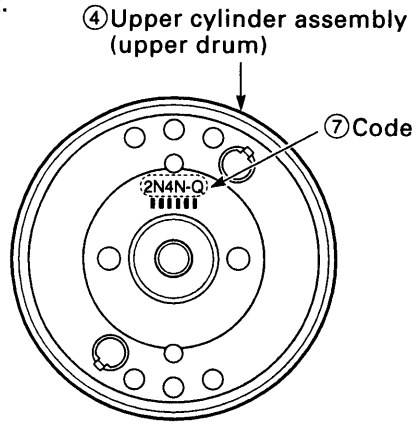


Fig.3-5-3

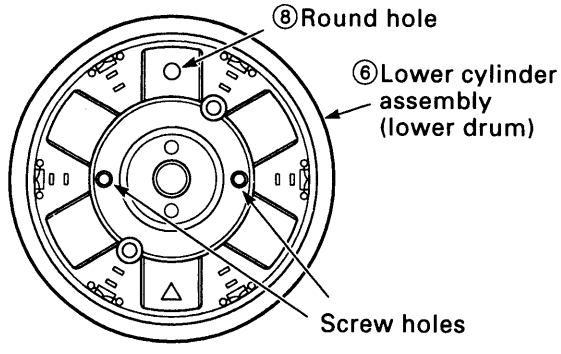


Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the three screws ①. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the cylinder mounting ② slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ② (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ③ on the mounting cylinder ② with the two holes ④ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

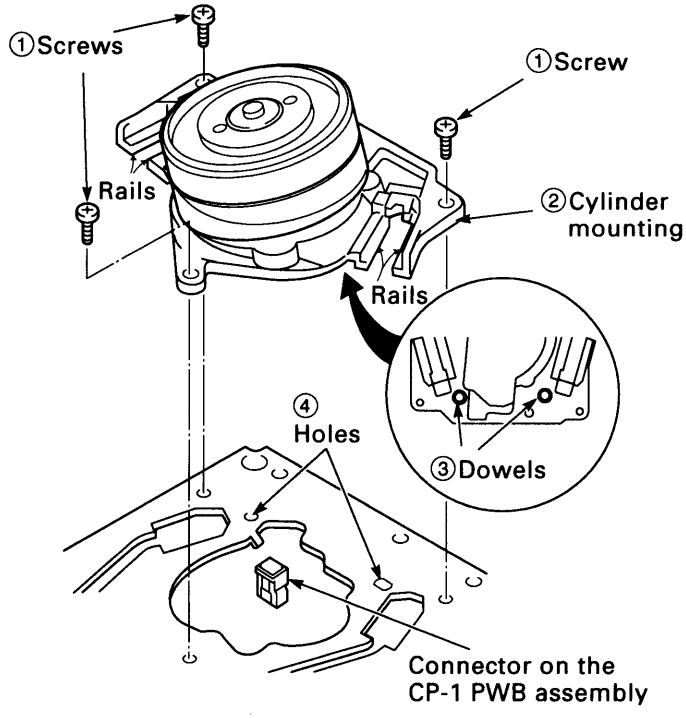


Fig.3-5-5

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-5-2 and remove the cylinder unit.
2) If you have removed the mechanism unit, remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑤.
4) Remove the three screws ⑥ and the stator ⑦.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑧ - beside the triangular mark on the rotor ④ - with the hole ⑨ in the rotor disk.
2. When fitting the screws ③ and ⑥, use the torque gauge screwdriver (VHJ-0014). give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑩ on the cylinder earth assembly ② with the holes ⑪ in the chassis.
4. If you have removed the cylinder unit, after assembly, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

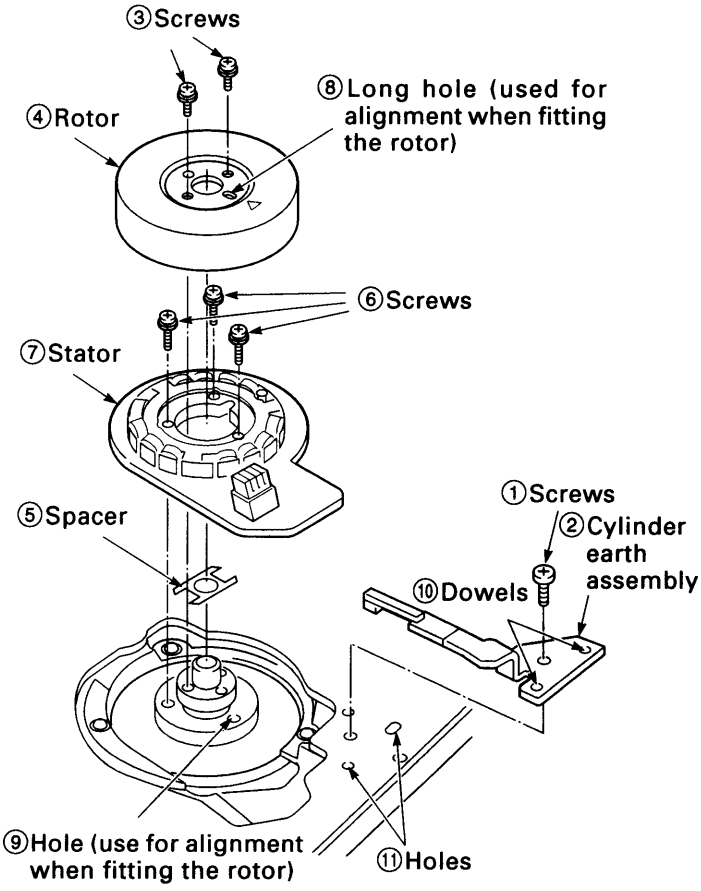


Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-2 and 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the cylinder mounting ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

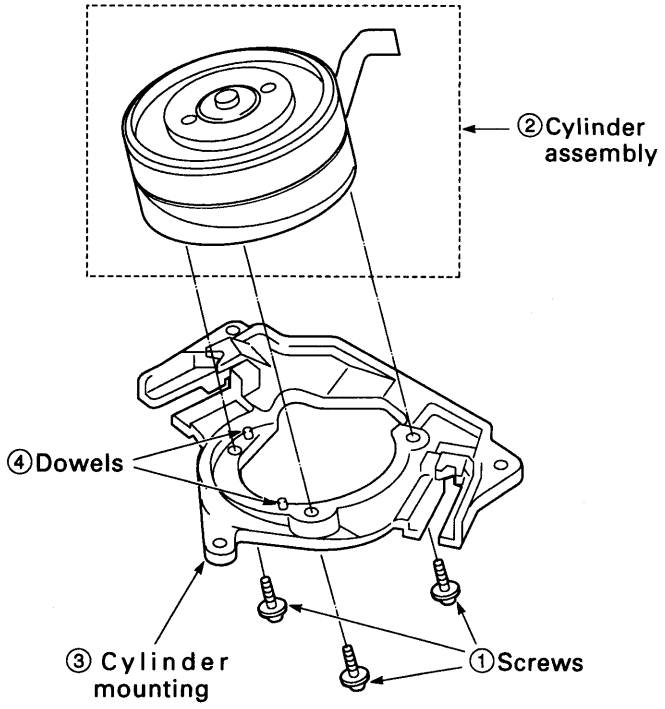


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ①, then remove the audio R/P head assembly (ACE head) ②and the washer ③.

ASSEMBLY NOTES:

1. Align the hole ④ on the audio R/P head assembly (ACE head) with the pin ⑤ on the chassis unit.
2. After assembly, check that the clamp ⑥ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

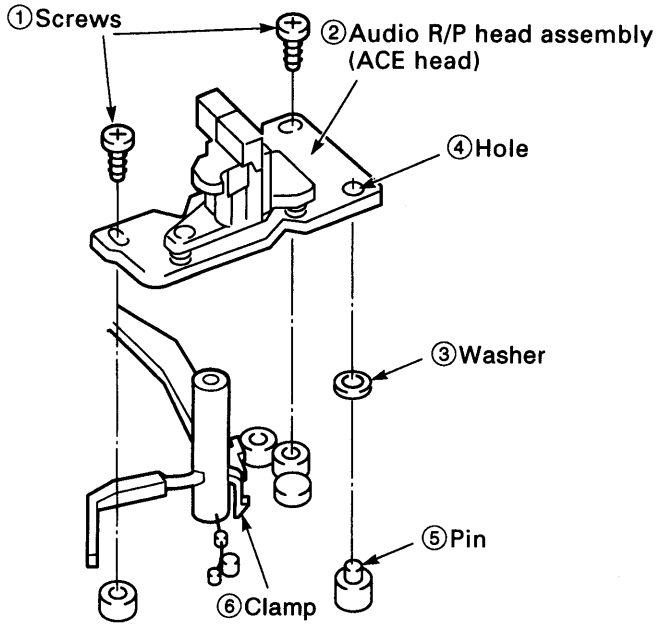


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

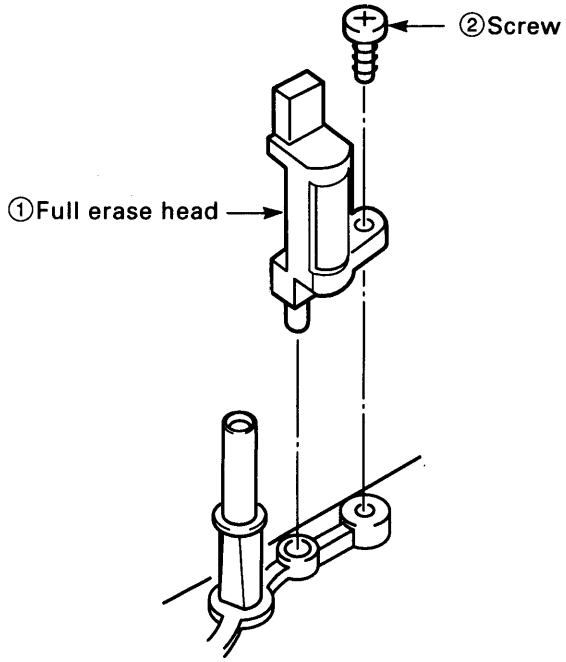


Fig.3-6-2

3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the screw ①, then remove the capstan mounting ②.
3) Remove the reel belt ③.
4) Remove the three screws ④ and the capstan motor ⑤.

ASSEMBLY NOTES:

1. Check that connector ⑥ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ④, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

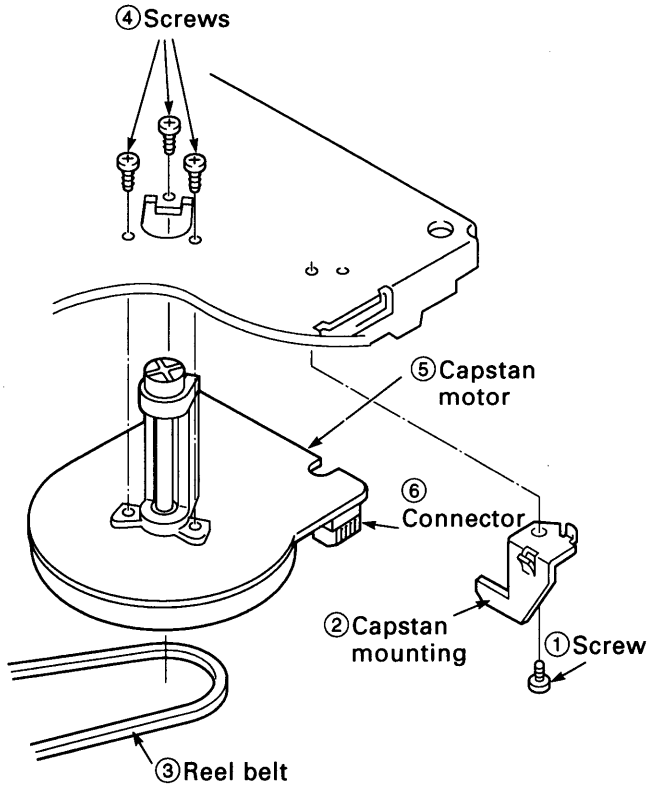


Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.

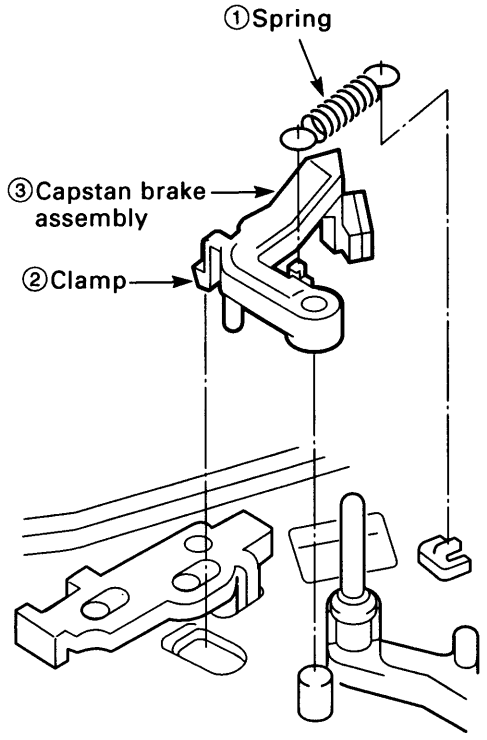


Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires ② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp ③, and remove the loading motor assembly ① and the damper ④. Be careful not to exert too much force on the clamp ③.
4) Remove the worm gear assembly ⑤. To maintain performance, do not dis-assemble the worm gear assembly ⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps ③ and ⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires ② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires ②, adjust them so that they do not touch the friction gear assembly.

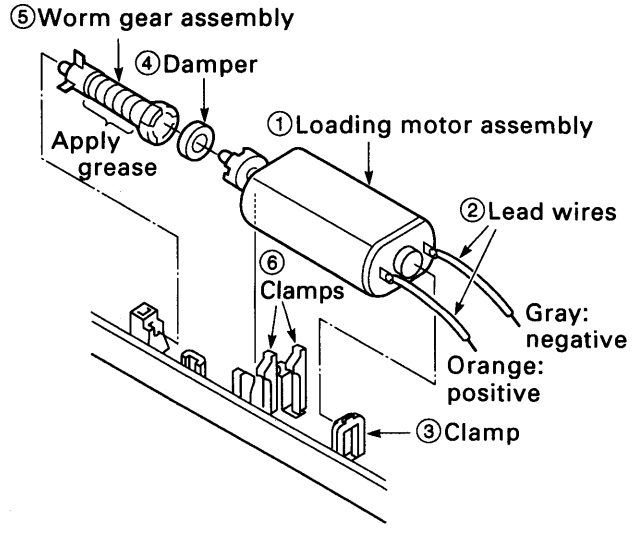


Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting ②.
2) Remove the spring ③, then remove the pinch roller lever assembly ④ off the pinch lift mounting ②. Before you do this, align the Indentation ⑤ on the pinch roller lever assembly ④ with the clamp ⑥ on the pinch lift mounting ②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

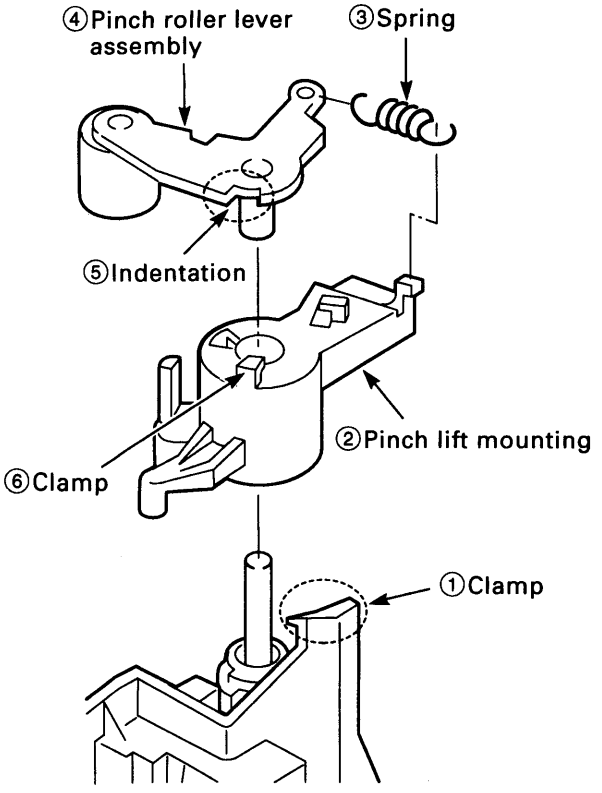


Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft ⑧ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

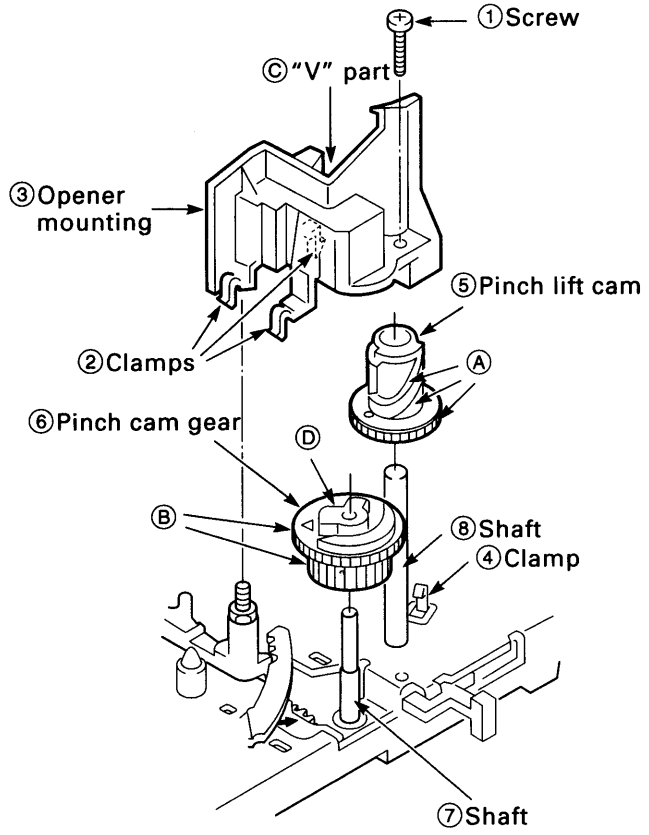


Fig.3-9-2

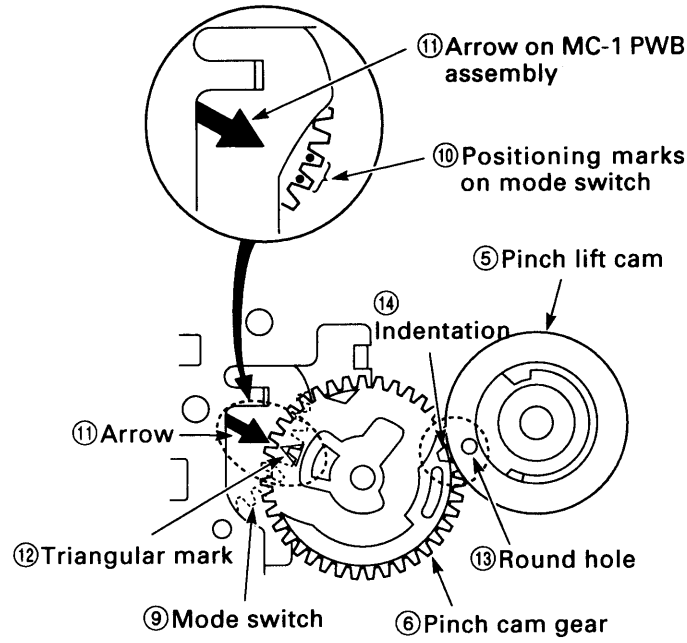


Fig.3-9-3

3-10. L GUIDE ACT LEVER ASSEMBLY, LOAD LEVER ASSEMBLY AND STOPPER LEVER ASSEMBLY (See Fig.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2 ,then remove the pinch roller lever assembly and the opener mounting.
3) Remove the stopper spring ①.
4) After removing the washer ②, remove the L guide act spring ③ and the L guide act lever assembly ④.
5) Remove the special nut ⑤, then remove the load lever assembly ⑥ and the L guide lever spring ⑦.
6) Remove the stopper lever assembly ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ④ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑦ into the stopper ⑪ and the load lever assembly ⑥ shown in Fig. A.
4) Put the pin ⑫ of the L guide act lever assembly into the cam groove ⑬ of the crescent slide.

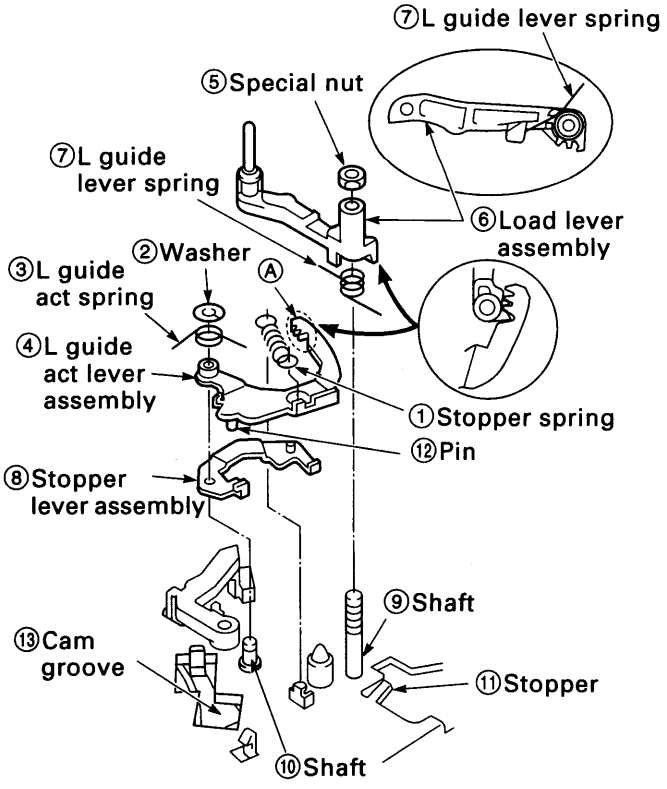


Fig.3-10-1

3-11. BT LEVER ASSEMBLY (See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①, and remove the sub BT spring ② on the underside of mechanism chassis.
4) Remove the clamp ③ on the underside of the mechanism chassis, then remove the BT lever assembly ④.
5) Remove the clamp ⑤ on the band brake assembly ⑥. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ④ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ④, be careful not to bend the stopper ⑦ or the S incline mounting assembly ⑧ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ④, as shown in Fig. B.
4. After assembly, make sure that the mountings on both ends of the band brake assembly ⑥ are positioned as shown in Fig. C.
5. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

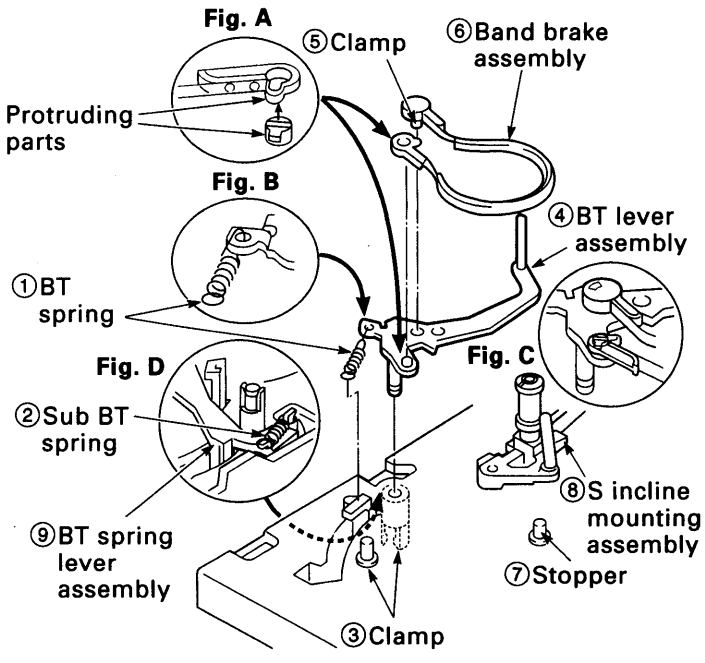


Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1. REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

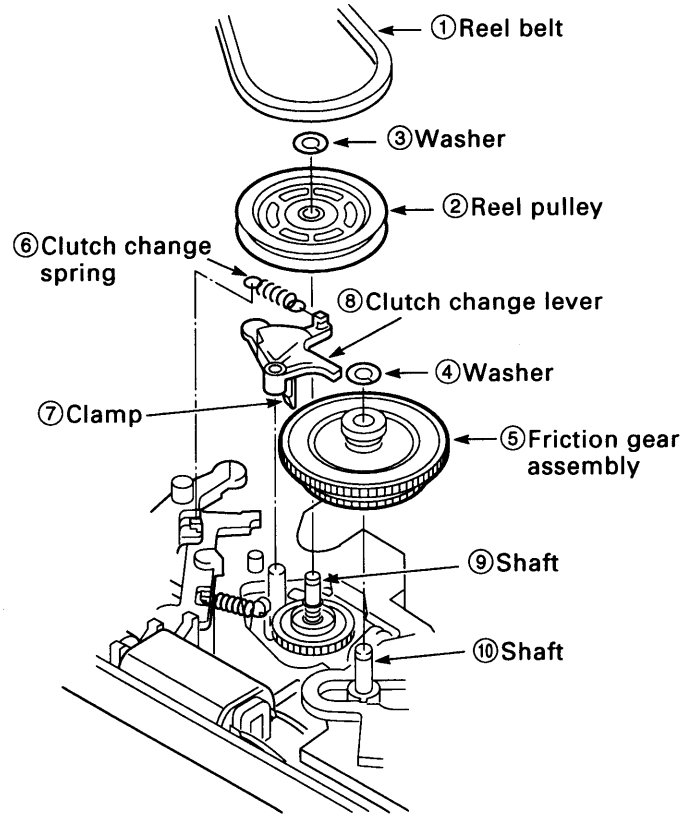


Fig.3-12-1

3-12-2. CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

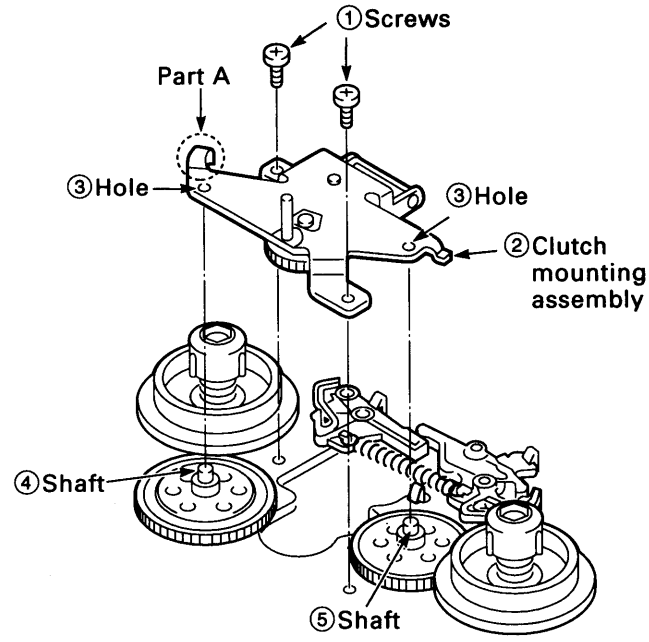


Fig.3-12-2

3-12-3. S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

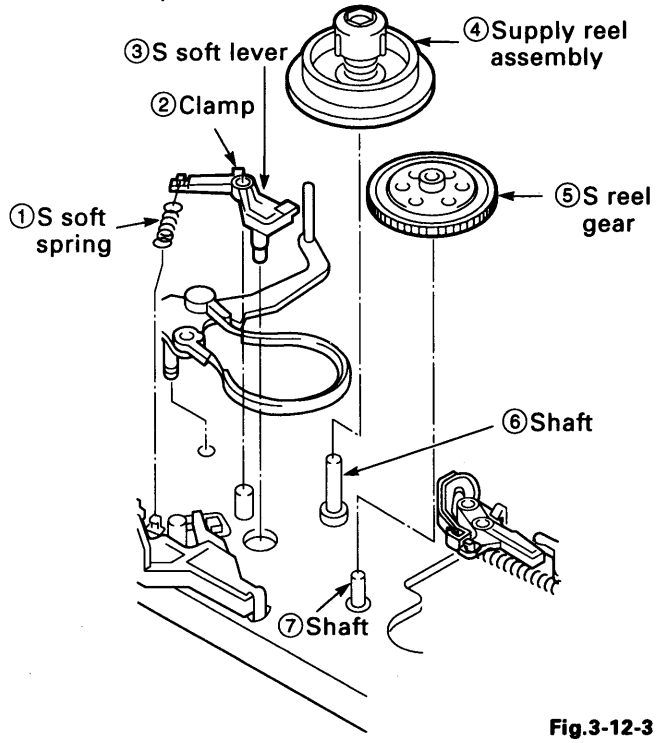


Fig.3-12-3

3-12-4.T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ② , then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

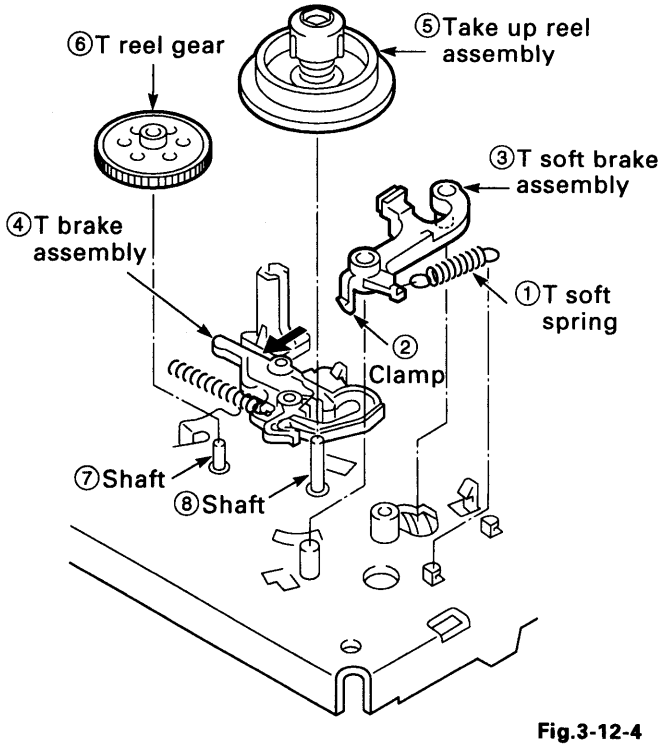


Fig.3-12-4

3-13. BRAKES

3-13-1.S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

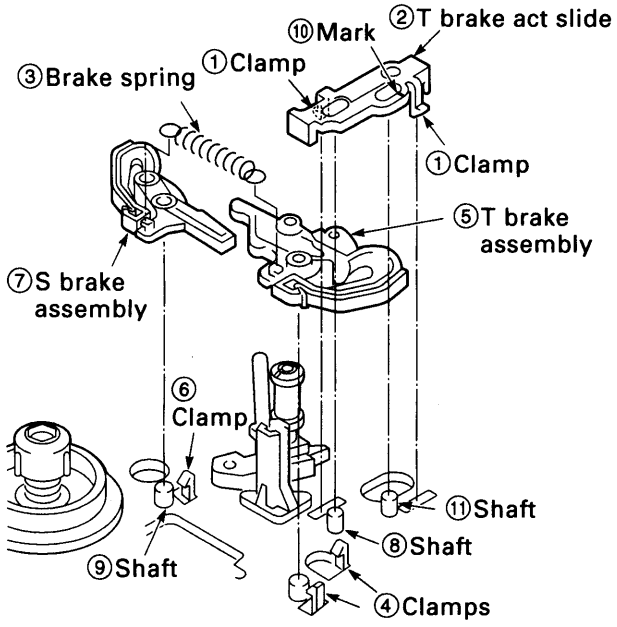


Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑫ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

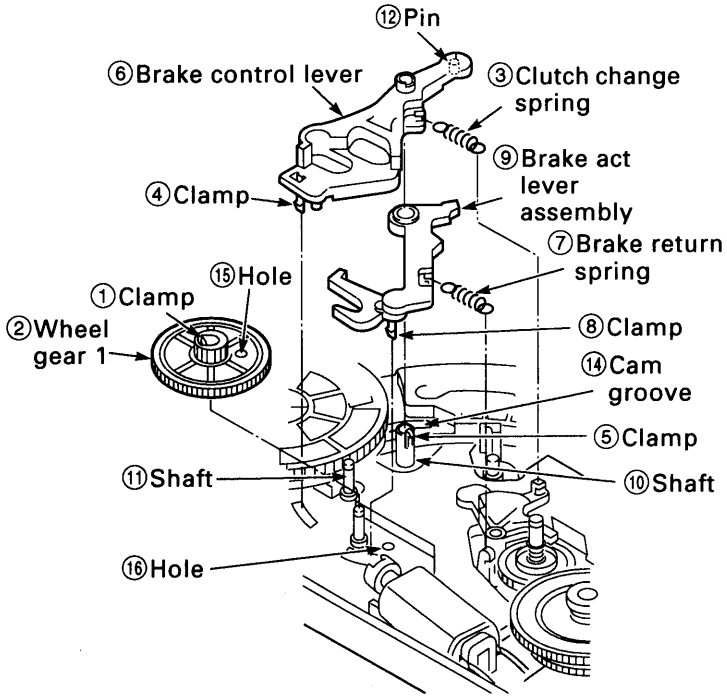


Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Remove the sub BT spring ②.
6) Press the BT spring lever assembly ③ until it touches the pin ④, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ⑤ shown in Fig. 3-13-3, and to the BT spring lever assembly ③ and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ③ on the Shaft ⑤, hook the BT spring onto the clamp ⑥ and press it until it touches the pin ⑦.
3. Make sure that the clamps ⑧, ⑨ and ⑩ have snapped into the S brake act slide ①. Align the arrow ⑪ on the S brake act slide ① with the arrow ⑫ on the mechanism chassis.

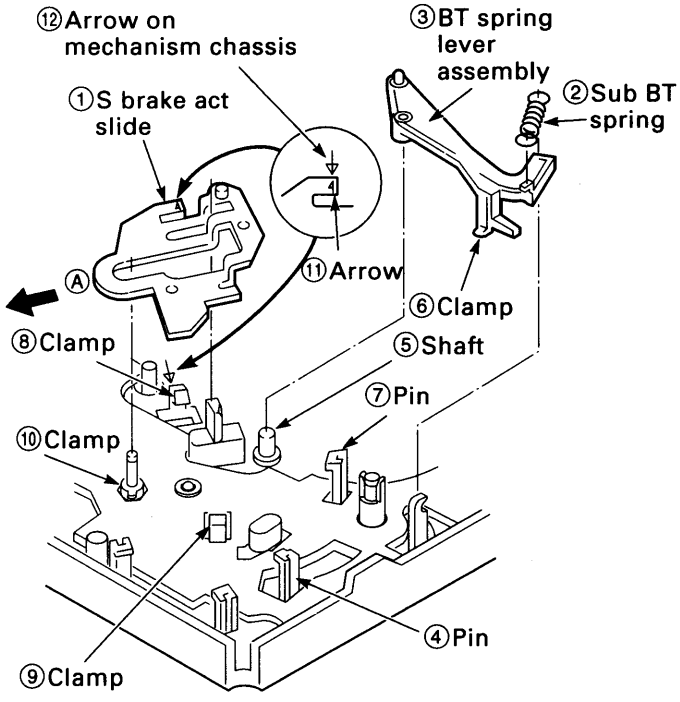


Fig.3-13-3

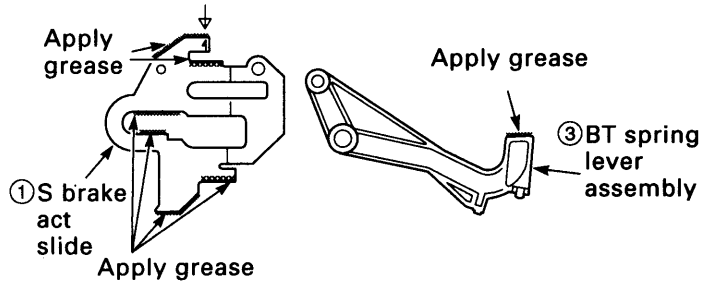


Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ② by unscrewing them counterclockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

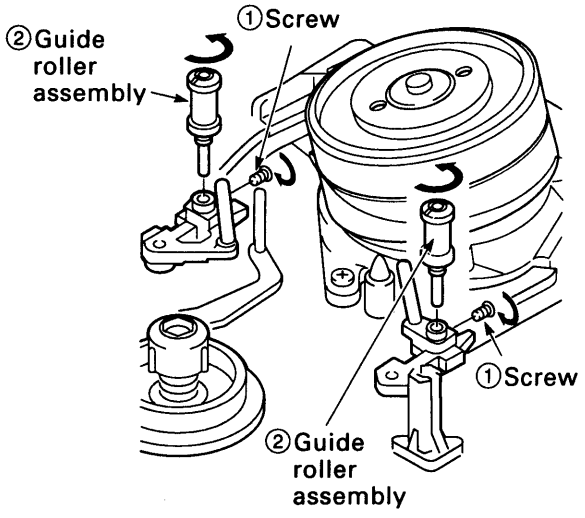


Fig.3-14-1

3-14-2.S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-5-2 and remove the cylinder unit.
3) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
4) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
5) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

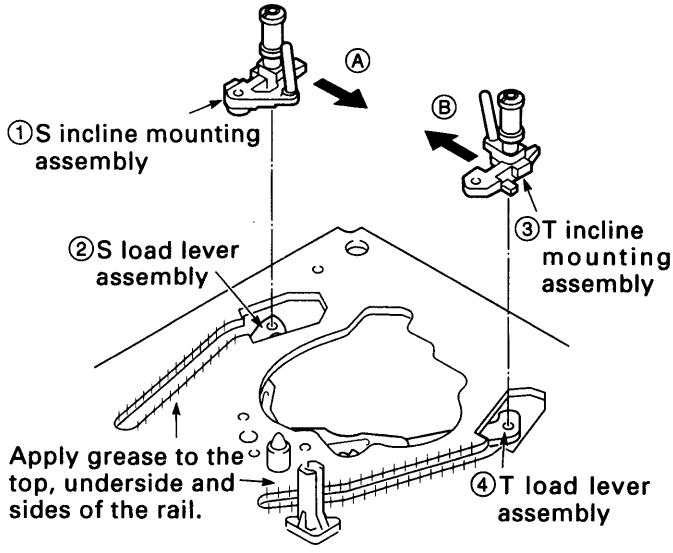

Ⓐ
Ⓑ
①S incline mounting assembly
②S load lever assembly
③T incline mounting assembly
Apply grease to the top, underside and sides of the rail.
④T load lever assembly

Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in ⒶⒷ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

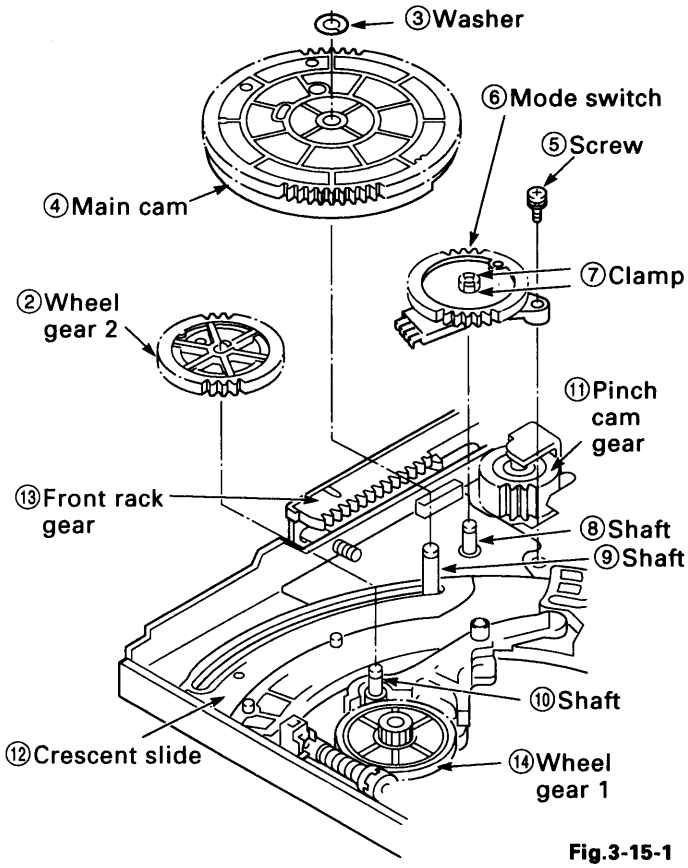


Fig.3-15-1

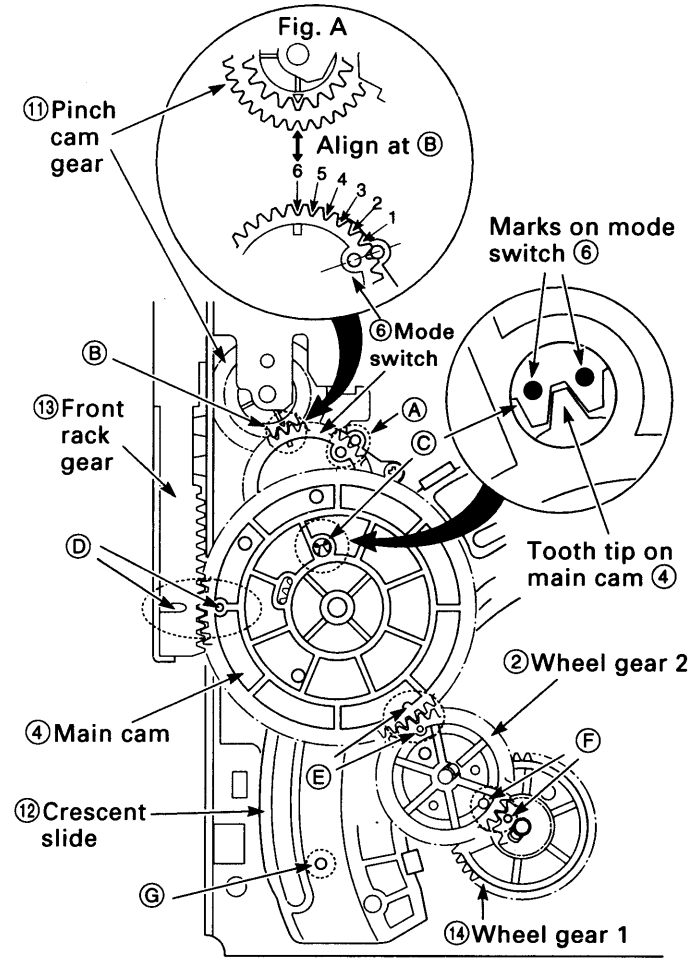


Fig.3-15-2

3-16. CRESCENT SLIDE (See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

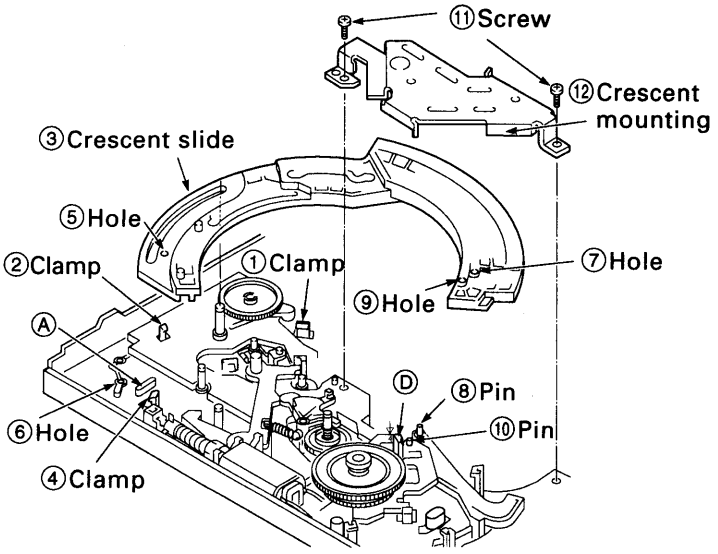


Fig.3-16-1

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp ④, then align the hole ⑤ with the hole ⑥ in the mechanism chassis. When you do this, check that the hole ⑦ is aligned with the pin ⑧ on the BT spring lever assembly, and that the hole ⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide ③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

Apply grease to the areas shown in ▓▓
• The places marked by dots should be greased particularly generously.

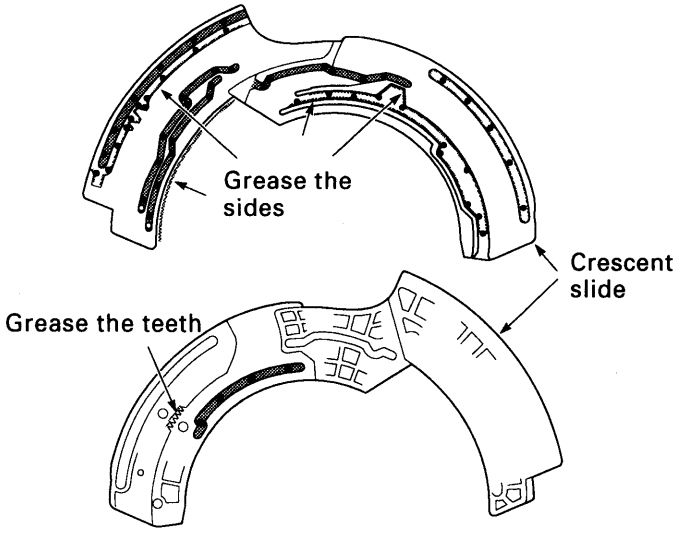


Fig.3-16-2

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

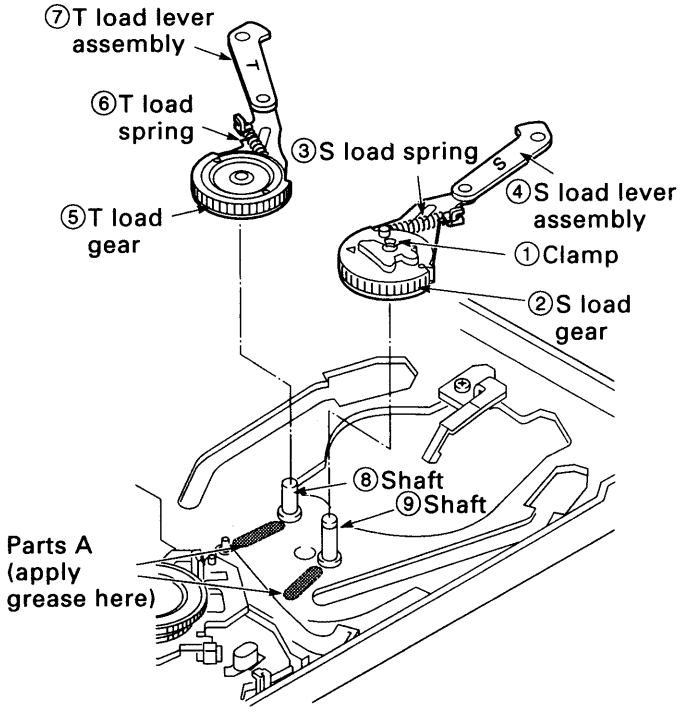
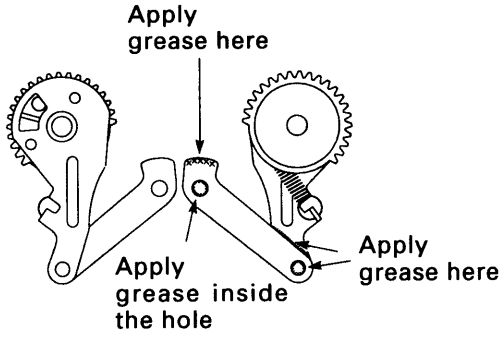


Fig.3-17-1

(T side)



(S side)

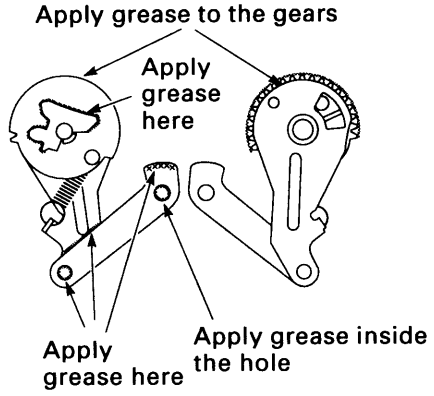


Fig.3-17-2

Fig. A: When tape loading is complete

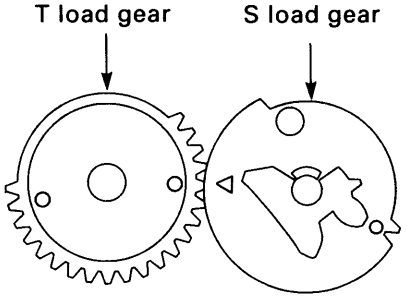


Fig. B: When tape unloading is complete

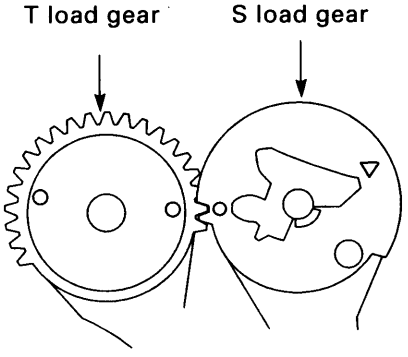


Fig.3-17-3

3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1 TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photo-receptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④. Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.

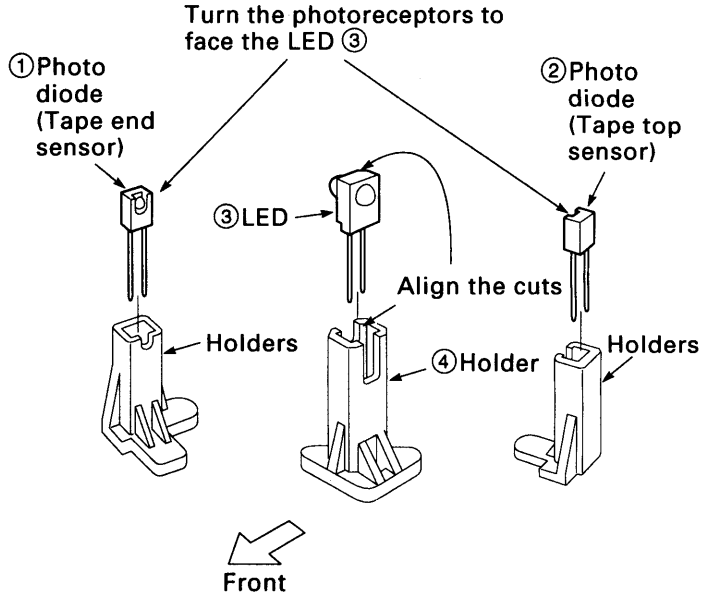


Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodé (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.

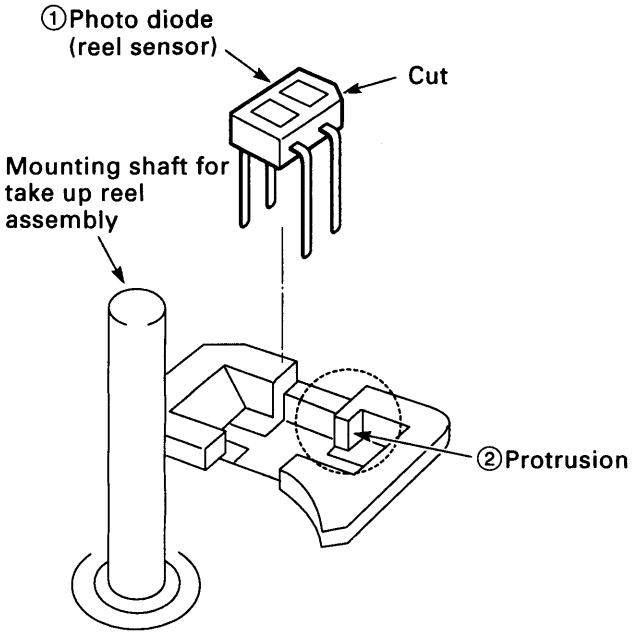


Fig.3-18-2

3-18-3.EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.

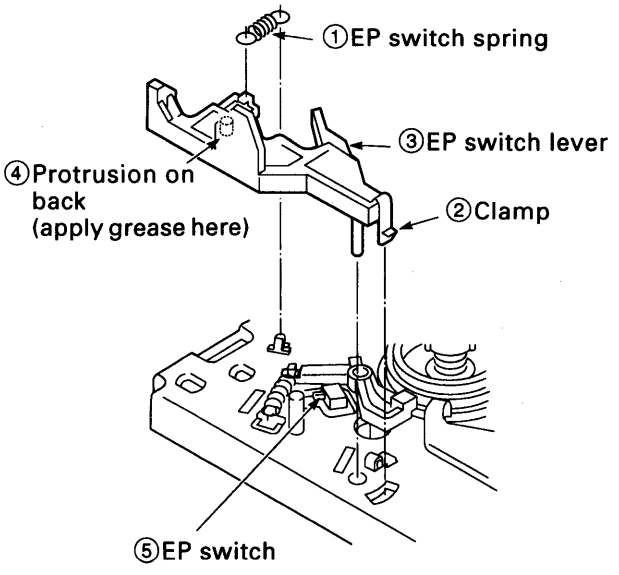


Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:

1. The measurements must be taken without any incandescent light or daylight.

2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm.
   Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.

3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).

4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 55 and 110g/cm (lock torque).

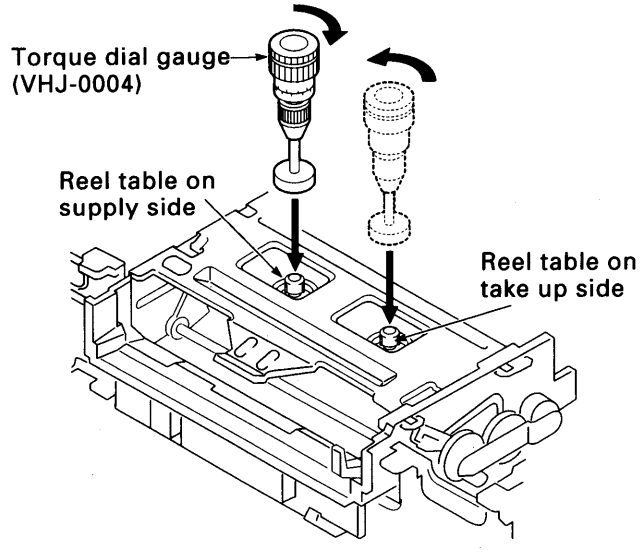


Fig.4-1-1

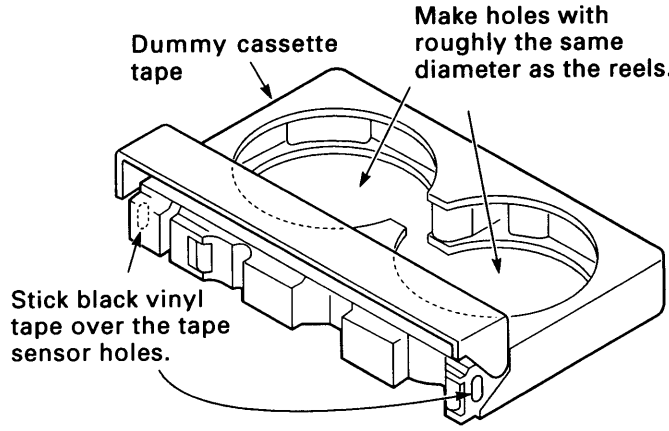


Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1. BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).

2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.

3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

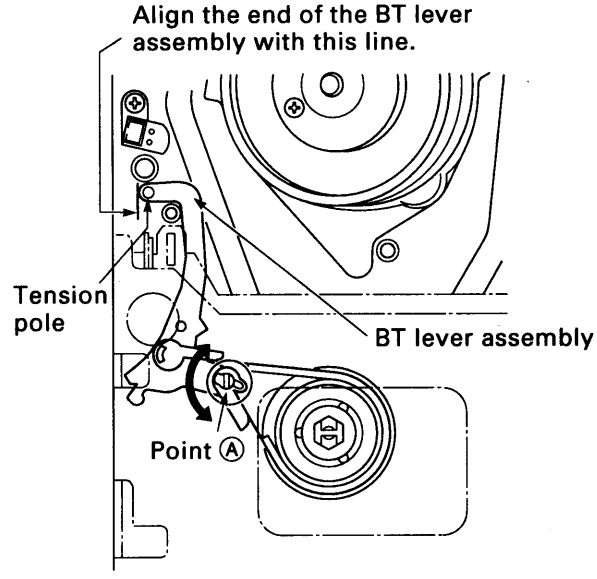


Fig.4-2-1

4-2-2. CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.

2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

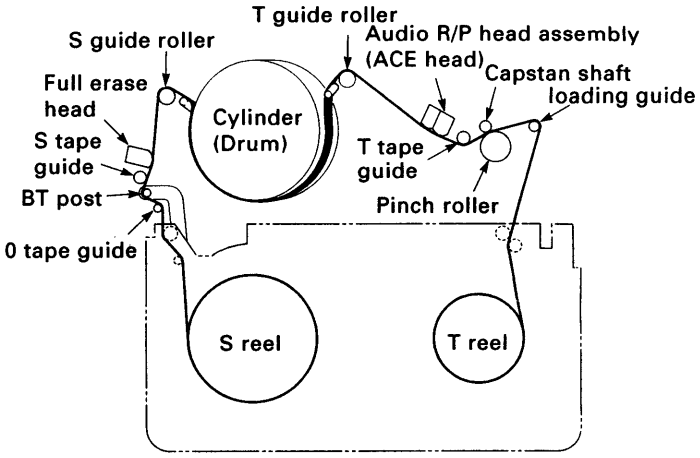


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz
PAL: For models with 625 scanning lnes and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE: The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2. LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0111) ③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly ① touches the height adjustment tool (VHJ-0111) ③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° counterclockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240). Wind the tape to the beginning, and repeat FF⟷REV five times (repeat for the same portion 30 to 60 seconds). If the bottom edge of the tape breaks, rotate the adjustment nut ④ in the counterclockwise direction by about 90°. Repeat FF ⟷REV five times again and check that the tape edge does not break (adjust again if it does). Next, repeat CUE⟷REV five times and check that the tape is not damaged. If damaged, rotate the adjustment nut in the clockwise direction by about 90°. Repeat FF⟷REW and CUE⟷REV and check that the tape is not damaged.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0111) when seen from directly overhead.

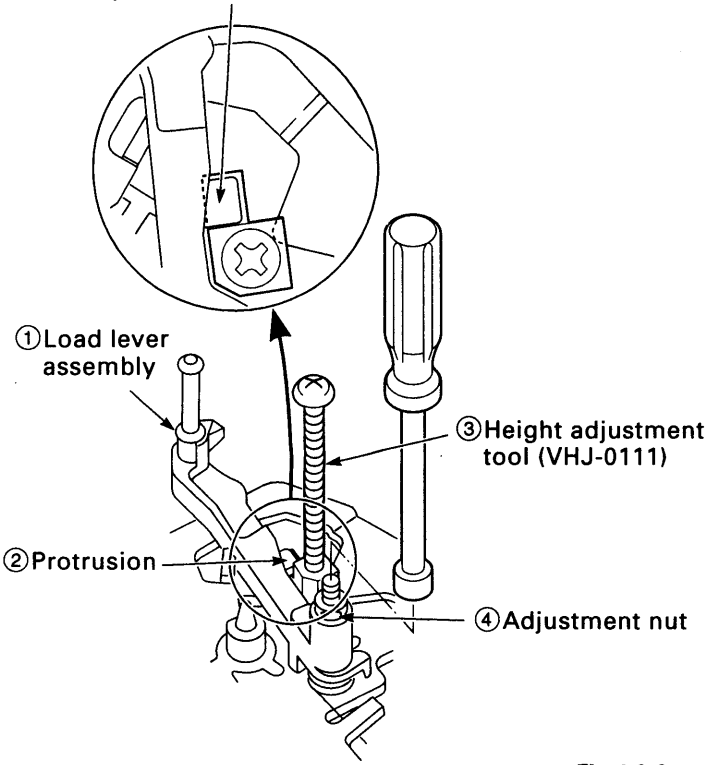


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Playback the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them counterclockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button, and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° counterclockwise.
3) Adjust the T guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from CUE to PLAY or from REV to PLAY. If the front half of the envelope waveform does fluctuate, tighten the S guide roller 1° to 20°. If the back half of the envelope waveform does fluctuate, repeat steps 3) and 4).

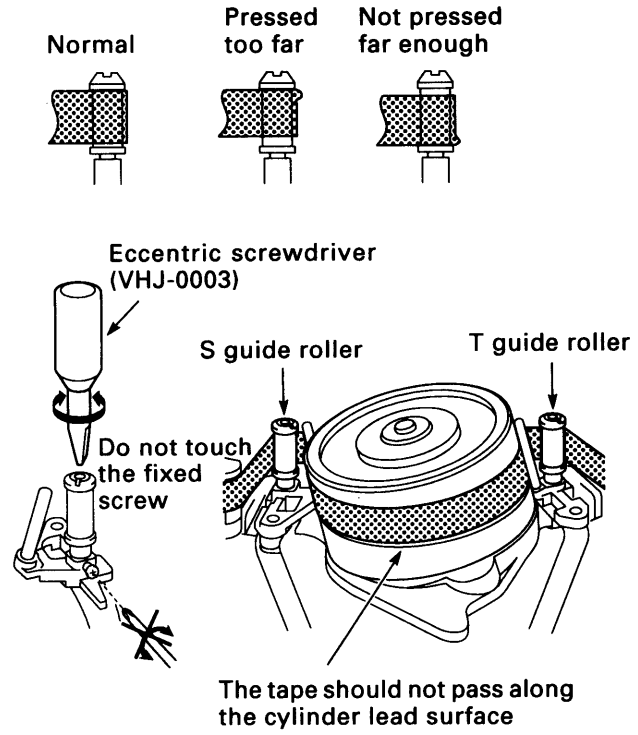

Normal
Pressed too far
Not pressed far enough
Eccentric screwdriver (VHJ-0003)
S guide roller
T guide roller
Do not touch the fixed screw
The tape should not pass along the cylinder lead surface

Fig.4-3-3

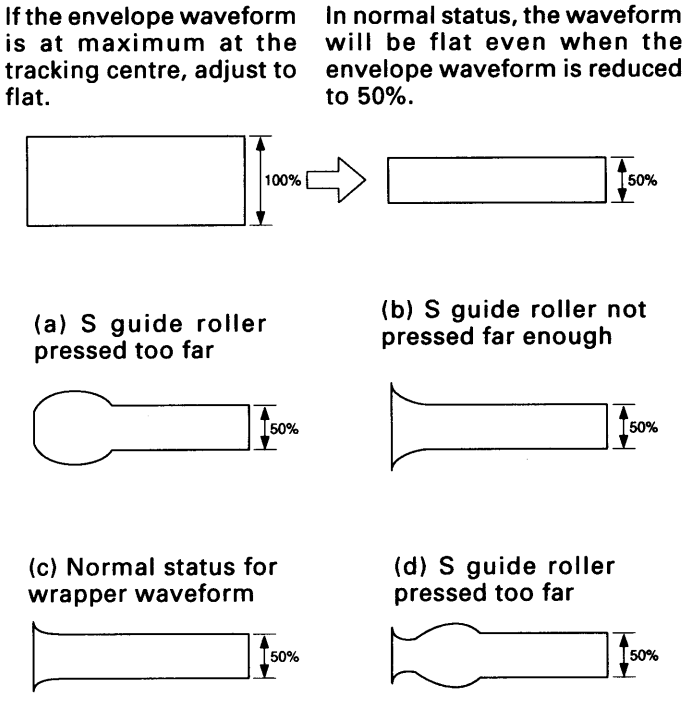

If the envelope waveform is at maximum at the tracking centre, adjust to flat.
In normal status, the waveform will be flat even when the envelope waveform is reduced to 50%.
100%
50%
(a) S guide roller pressed too far
(b) S guide roller not pressed far enough
50%
50%
(c) Normal status for wrapper waveform
(d) S guide roller pressed too far
50%
50%

Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Hight/azimuth adjustment (See Fig.4-3-5)

1) Refer to section 4-3-3, complete the GUIDE ROLLER adjustment, and perform the AUDIO R/P HEAD adjustment.
   As the audio R/P head assembly (ACE HEAD) has been temporarily adjusted before shipment, do not rotate screws unnecessarily.
2) Mark screw Ⓐ, screw Ⓑ, and bracket with a waterproof marker so that their original positions can be known even after the screws are rotated.
   Marking screws Ⓐ and Ⓑ in the same direction will enable the adjustment mentioned later to be performed easily.
3) Play the adjustment tape (NTSC:VHJ-0005, PAL:VHJ-0008), and observe the audio output waveform using an oscilloscope.
   Loosen screw Ⓑ in the counterclockwise direction to decrease the audio output level. Then tighten it in the clockwise direction until the maximum level. Tighten further in the clockwise direction to decrease the level, and loosen in the counterclockwise direction until the maximum level.
4) Rotate screw Ⓐ in the same direction by the same degree as screw Ⓑ in step 1. (Check visually according to the mark made.)
5) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (temporary azimuth adjustment).
6) Perform the adjustments in 3) to 5) again.
7) Perform fine adjustments using screw Ⓑ.
   Perform the same adjustments as 3), and if screw Ⓑ was adjusted by more than 30 degrees, perform the adjustment in step 4) again, and then perform fine adjustments.
8) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (actual azimuth adjustment).

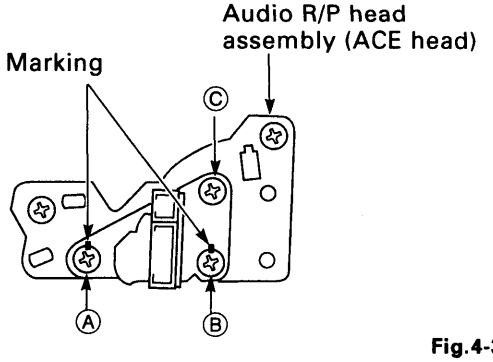


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (tracking + and tracking –) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VSJ-1001 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (tracking + and tracking –) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the tracking – button the messages "T -: " and "T - -: " will appear, while if you keep pressing the tracking + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

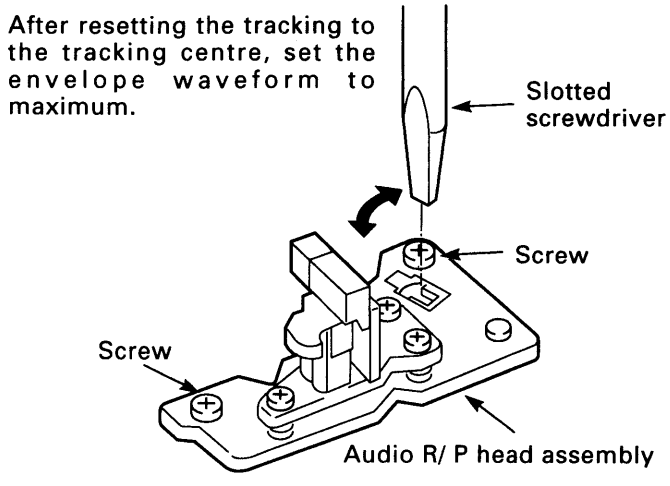

After resetting the tracking to the tracking centre, set the envelope waveform to maximum.
Slotted screwdriver
Screw
Screw
Audio R/ P head assembly

Fig.4-3-6

4-3-5. CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to REV or from REV to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, CUE, REV or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, CUE or REV modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

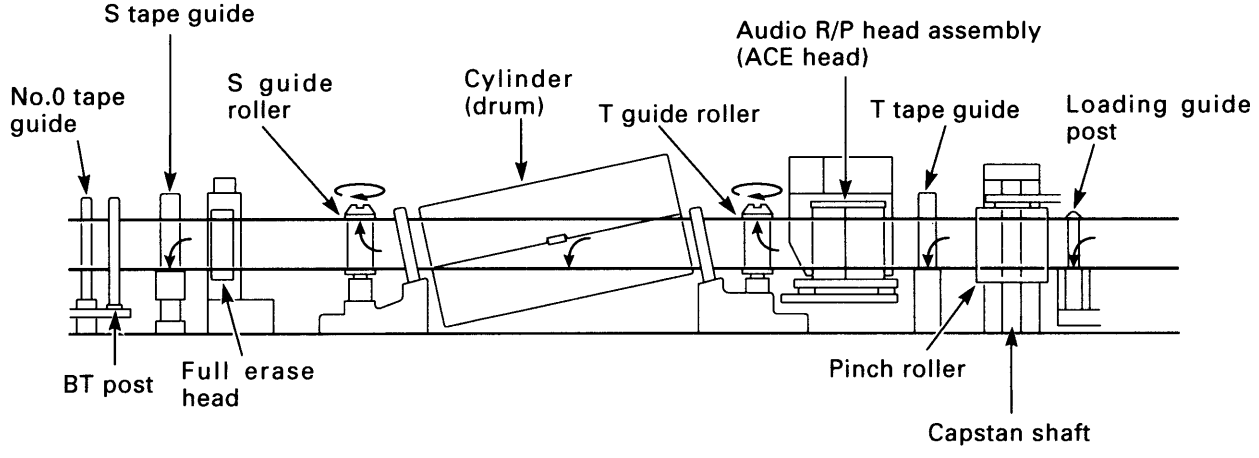


Fig.4-3-7

June/'97/2300 Printed in Japan

SANYO Electric Co., Ltd.
Osaka, Japan

FILE NO.

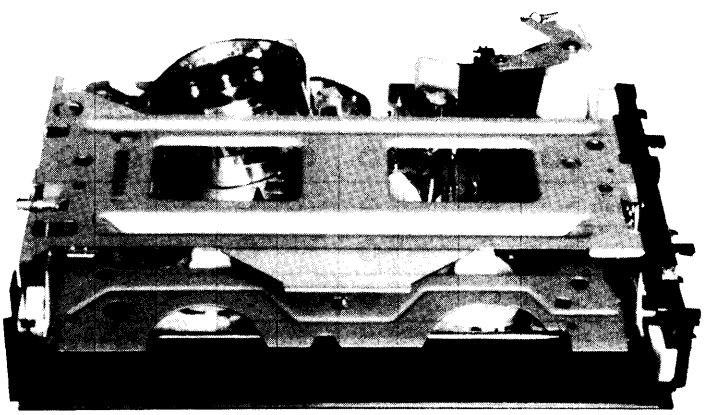
BASIC SERVICE TECHNICAL INFORMATION

SANYO

FISHER®

Video Cassette Recorder

V95 I MECHANISM



VHS
PAL SECAM NTSC

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REFERENCE No.MM531433

Notice

SANYO

- [●] CORRECTION
- [ ] PRODUCTION CHANGE
- [ ] SERVICE FLASH
- [ ] ADD INFORMATION
- [ ]
- [ ]

FISHER

FILE NO.

Please add this notice to the manual listed below.

Category : VIDEO CASSETTE RECORDER **Date : July/10/ '95**

Model : V95I MECHANISM **REF : No. MM531433**

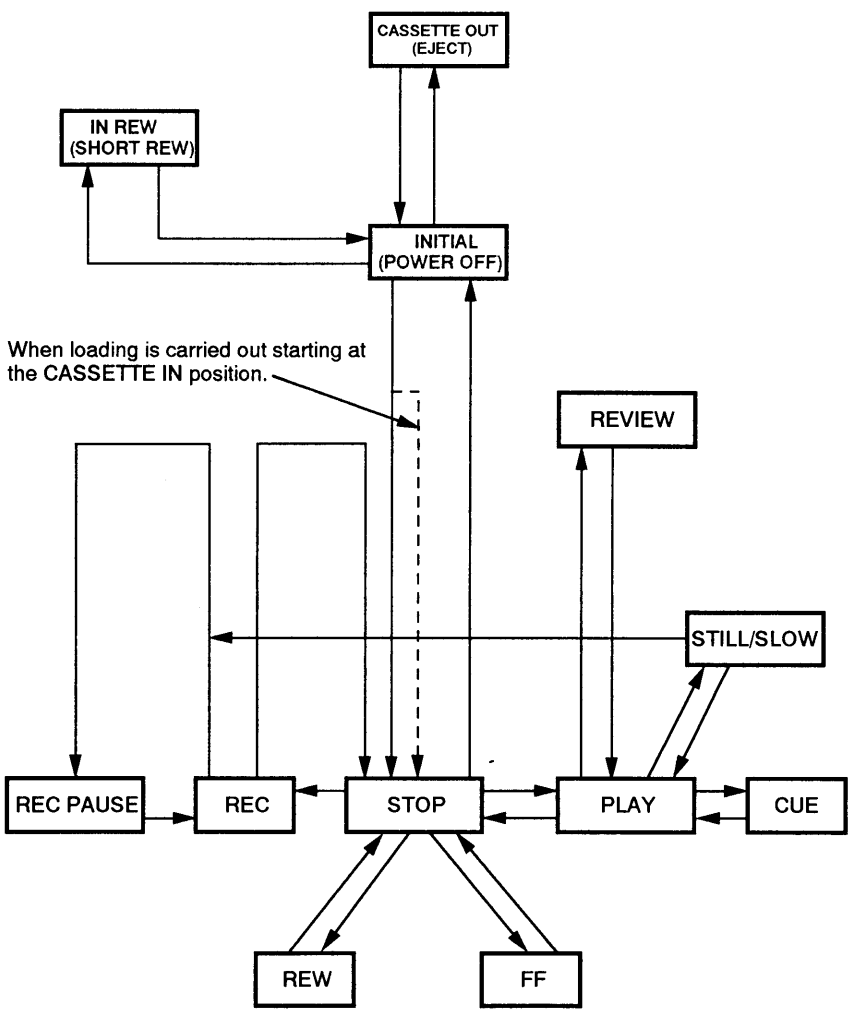
This correction notice is a revised edition of the V95I mechanism basic service technical information (Reference No. MM531433).

2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.
2	IN REW
0	
7	INITIAL ⑦
0	Cleaner roller assembly: ON
1	S/T mounting incline assembly pressure begins.
0	
1	S/T mounting incline assembly pressure ends.
	REVIEW ①
0	
2	IDLER pos. ② (Pinch roller OFF)
0	
3	STILL/SLOW ③
0	
5	PLAY/STOP ⑤
0	
4	BRAKE pos. ④
0	
6	FF/REW ⑥



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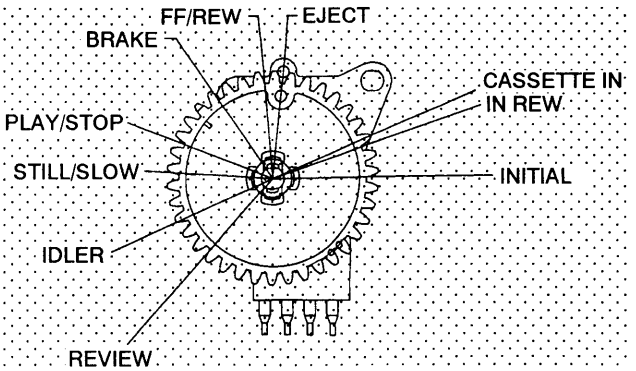
REFERENCE No. MM 531433-01

MODE SWITCH OUTPUT TABLE

HEX DATA	SW DATA 1	SW DATA X	SW DATA Y	SW DATA Z	SW DATA 2
0	5.0V	H	H	H	5V
1	5.0V	H	H	L	0V
2	2.5V	H	L	H	5V
3	2.5V	H	L	L	0V
4	3.4V	L	H	H	5V
5	3.4V	L	H	L	0V
6	2.0V	L	L	H	5V
7	2.0V	L	L	L	0V

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS



2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Principal parts \ Mechanism mode	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	***OFF***	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	***UNLO***	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.

Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

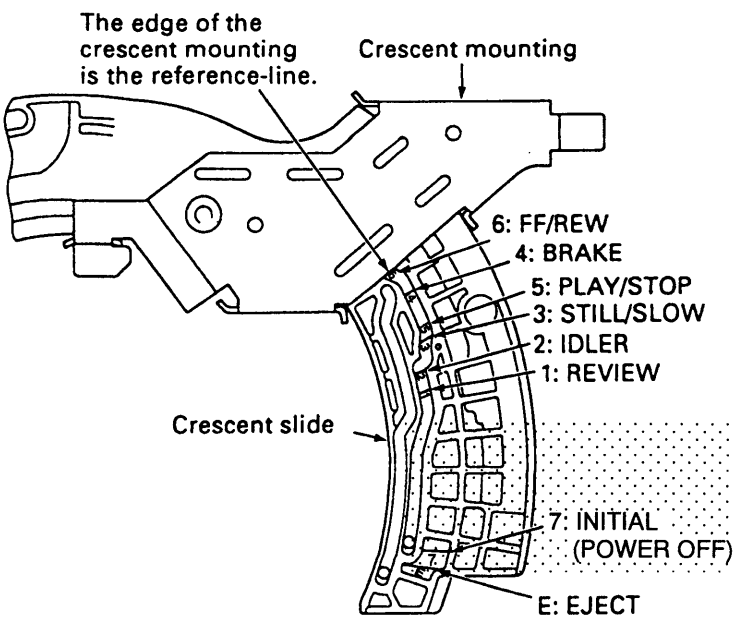


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.

Use it as a means of finding out the symptoms and cause of the error before performing repairs.

For details, refer to the separate service manual for the respective models.

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○Clean ◎Check △Oil

Part maintained \ Hours of use (H)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape path system	Tape guide	○	○	○	○	○	○	○	○	○	○	
	ACE head, full erase head	○	○	○	○	○	○	○	○	○	○	
	Cylinder (drum)	○	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	The life of parts varies enormously, depending on the environment in which the part is used.
	Cleaner roller assembly		◎		◎		◎		◎		◎	
	Pinch roller	○	○	○	○	○	○	○	○	○	○	
Drive system	Reel table		○		○△		○		○△		○	
	Reel belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Relay gear, Pulley shaft, Gear shaft		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Perform-ance checks	Back tension		◎		◎		◎		◎		◎	Playback tension torque: 30 to 50g/cm
	Brake system		◎		◎		◎		◎		◎	
	FWD, REW, PLAY torque, REV torque		◎		◎		◎		◎		◎	FWD: 600g/cm or over REW: 600g/cm or over PLAY (SP mode): 80 to 140g/cm REV: 120 to 220g/cm

1-1-2. CLEANING

1. Cylinder (Drum) (See Fig.1-1-1)

Moisten a chamois with methyl alcohol and clean the video head (including the Hi-Fi audio head) and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

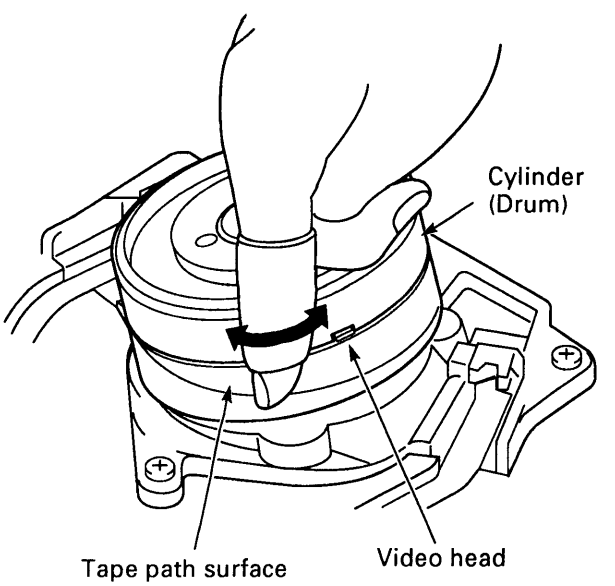


Fig.1-1-1

1-2. SERVICE TOOLS

1-2-1. SERVICE TOOLS

NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.		Remarks
		NTSC	PAL	
1	Alignment tape	VHJ-0005	VHJ-0008	SP colour bar 1kHz (normal)
2	Alignment tape	VHJ-0006	VHJ-0009	SP monoscope 7kHz (normal)
3	Alignment tape	VHJ-0007	———	EP monoscope
4	Alignment tape	———	VHJ-0052	LP monoscope
5	Eccentric screw driver	VHJ-0003		Used to adjust the tape path
6	Nut box	VHJ-0048		Used to adjust the height of the lever load assembly
7	Torque dial gauge	VHJ-0004		Used to measure reel winding torque
8	Cassette torque meter	VHJ-0016		Used to measure back tension torque
9	Load lever assembly height adjustment tool	VHJ-0102		Used to adjust the height of the load lever assembly
10	Torque gauge screwdriver	VHJ-0014		Used to adjust the tightening torque of screws
11	3 mm dia. bit for torque screwdriver	VHJ-0045		Used to replace the bit of the torque gauge screwdriver
12	Video head removing tool	VHJ-0041		Used to remove the upper cylinder
13	Oil	VHJ-0099		
14	Grease	VHJ-0100		
15	Grease	VHJ-0101		
16	Relay cables	VHJ-0106		Relay cables of mechanism and CP-1 PWB assembly

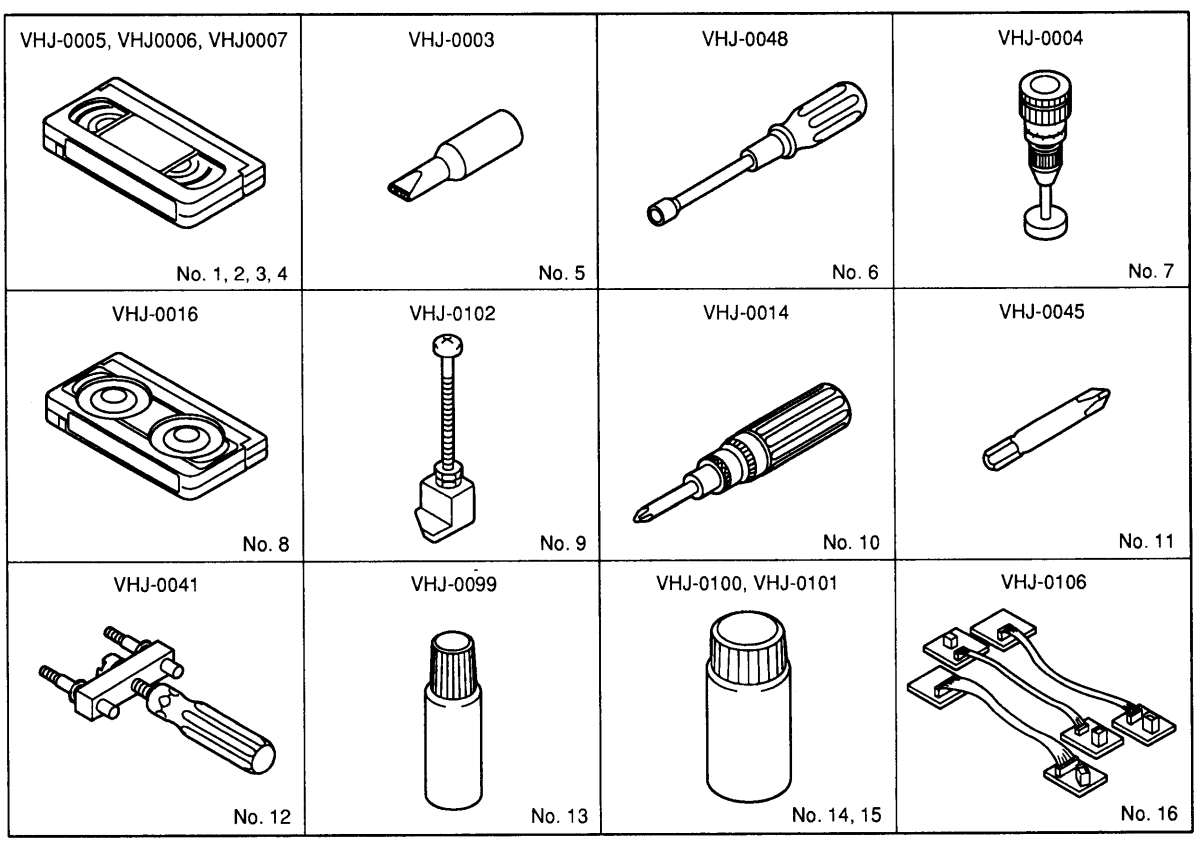


Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0106)

The mechanism can be repaired without using the relay cable (VHJ-0106). As shown in Fig. 1-3-1, the relay cable (VHJ-0106) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-3-1 when inserting/ejecting the cassette.
NOTE 2: For NTSC models, be sure to connect the VM-1 PWB assembly and CP-1 PWB assembly.

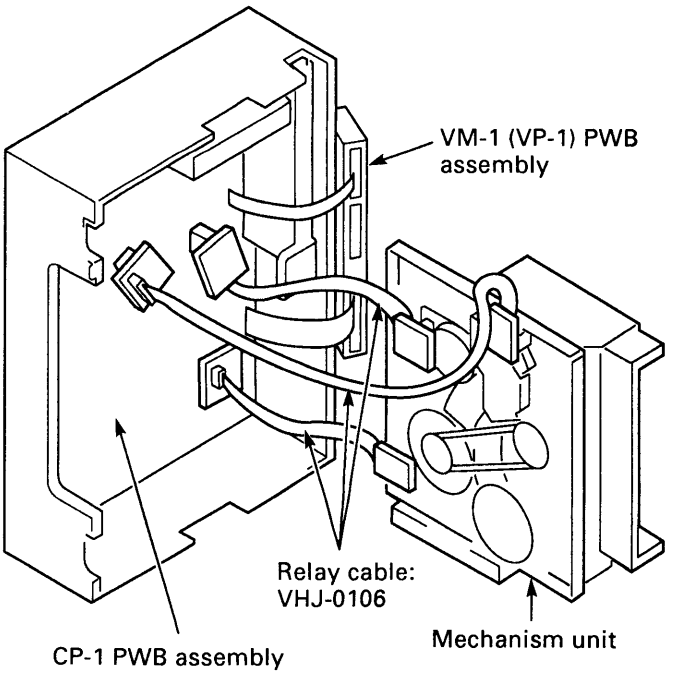


Fig. 1-2-2

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

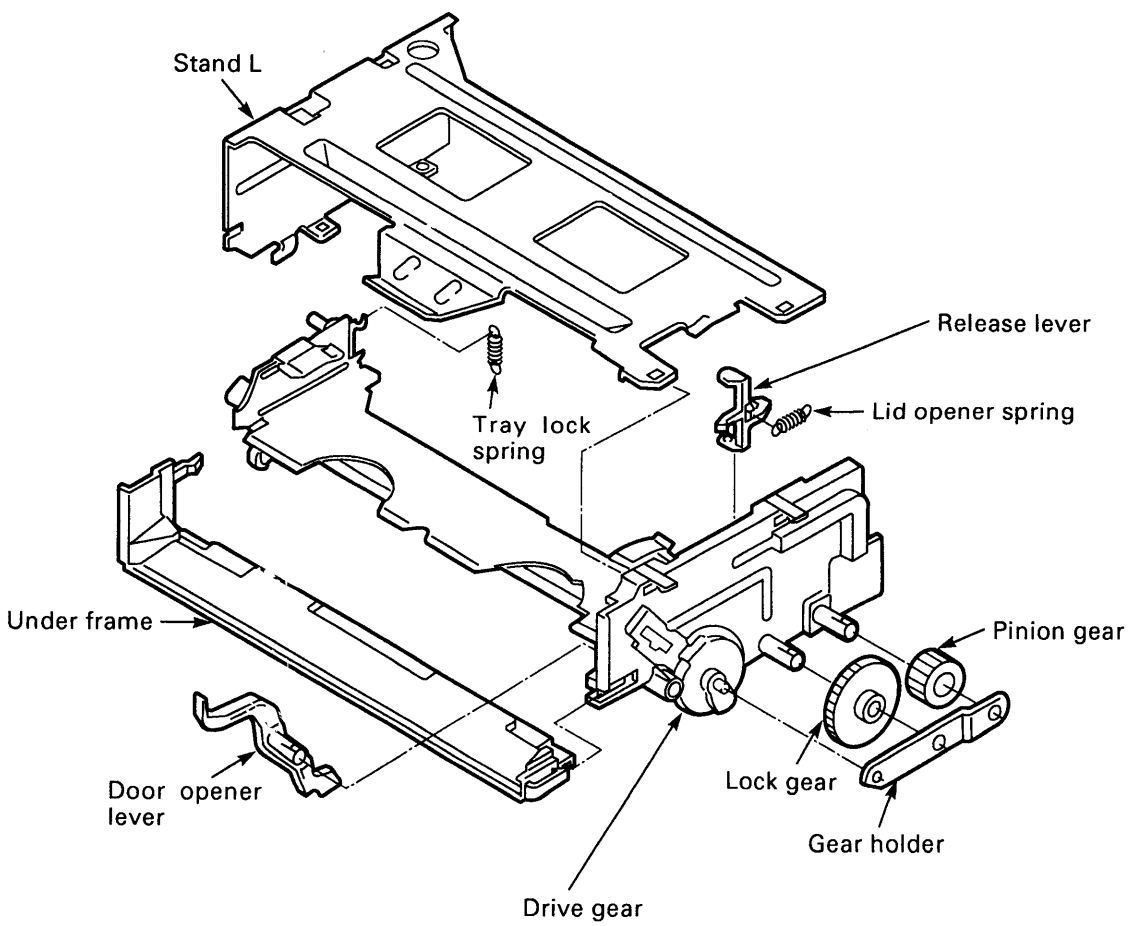


Fig. 2-1-1

2-1-2. TOPVIEW

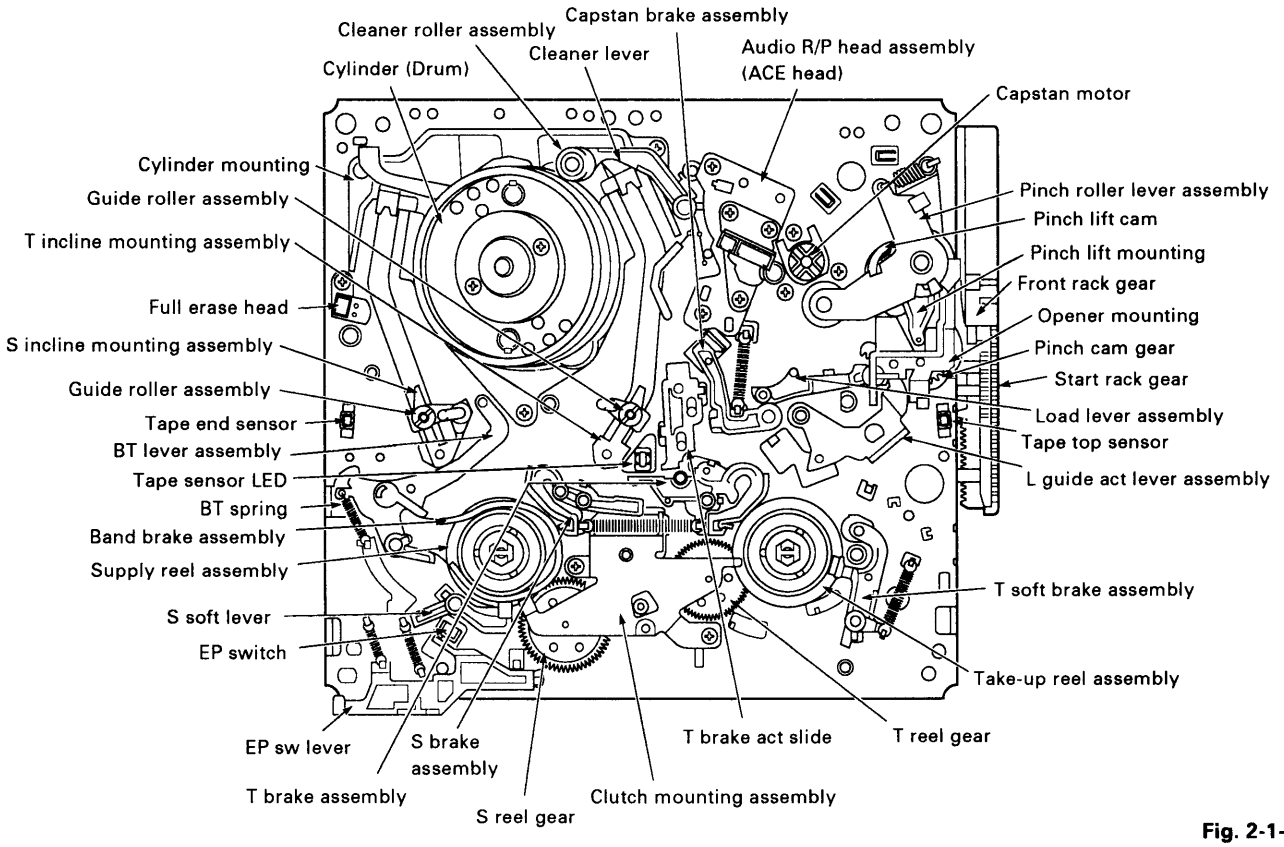


Fig. 2-1-2

2-1-3. UNDERSIDE

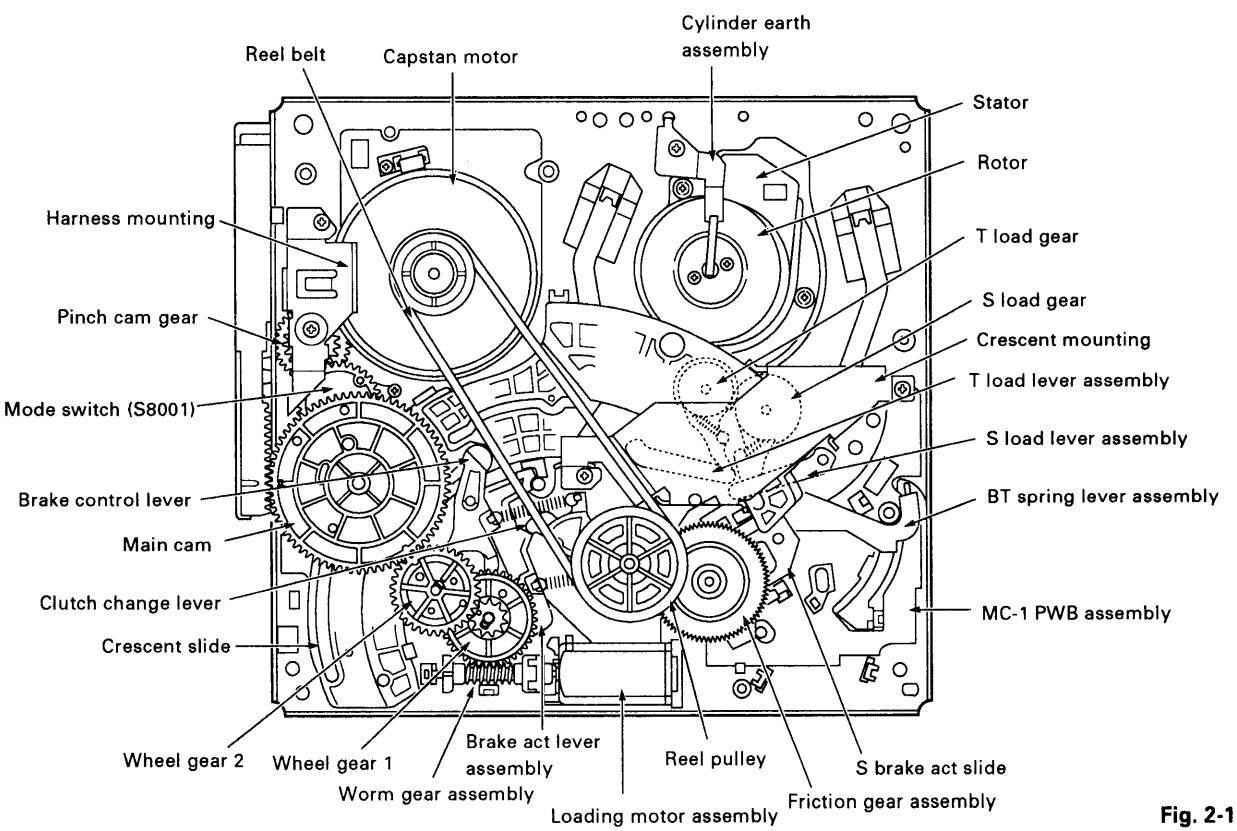


Fig. 2-1-3

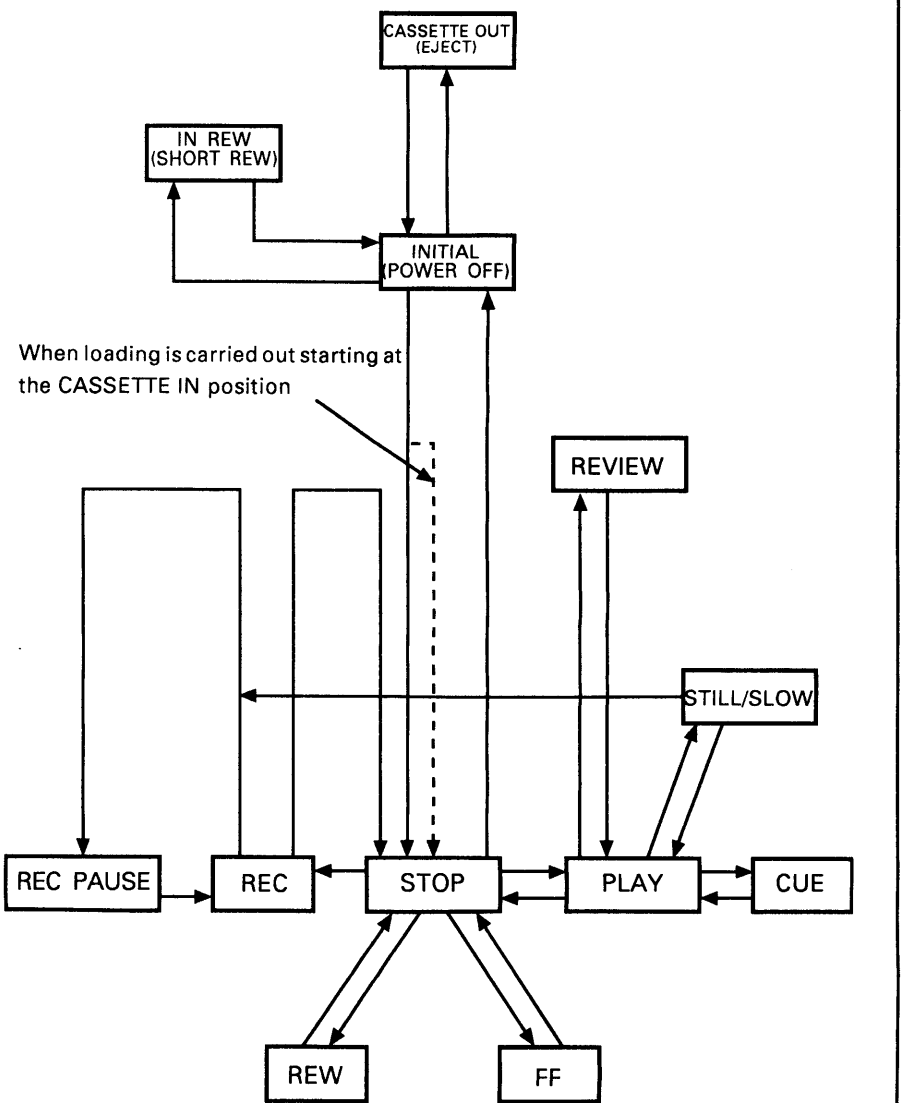
2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section.
2	Vertical shift section.
6	IN REW Ⓡ
0	
7	INITIAL ⑦
0	Cleaner roller assembly: ON
1	S/T mounting incline assembly pressure begins.
0	S/T mounting incline assembly pressure ends.
1	REVIEW ①
0	
2	IDLER pos. ② (Pinch roller OFF)
0	
3	STILL/SLOW ③
0	
5	PLAY/STOP ⑤
0	
4	BRAKE pos. ④
0	
6	FF/REW ⑥

The principal mode-switching states of the mechanism



MODE SWITCH OUTPUT TABLE

HEX DATA	SW DATA 1	SW DATA X	SW DATA Y	SW DATA Z	SW DATA 2
0	5.0V	H	H	H	5V
1	5.0V	H	H	L	0V
2	2.5V	H	L	H	5V
3	2.5V	H	L	L	0V
4	3.4V	L	H	H	5V
5	3.4V	L	H	L	0V
6	2.0V	L	L	H	5V
7	2.0V	L	L	L	0V

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

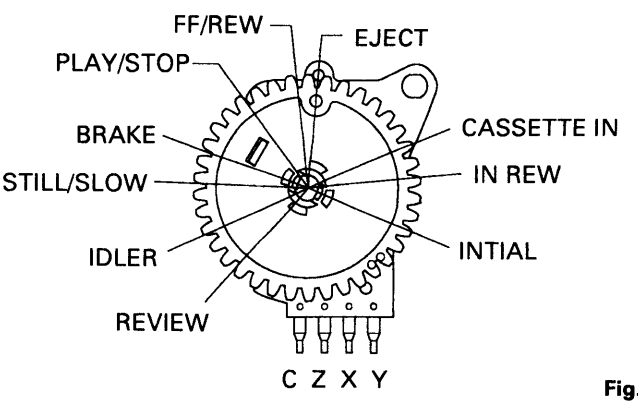


Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Mechanism mode / Principal parts	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.

Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

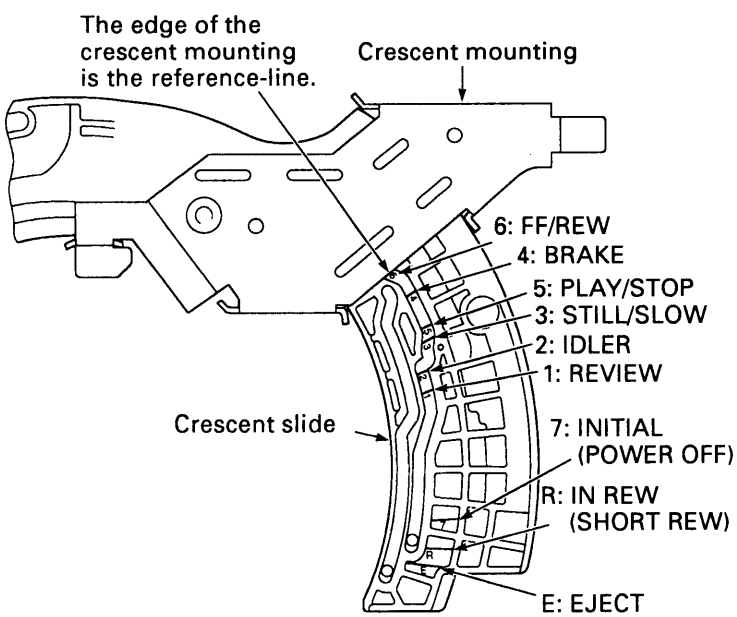


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.

Use it as a means of finding out the symptoms and cause of the error before performing repairs.

For details, refer to the separate service manual for the respective models.

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of dis-assembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1 and 3-1-2. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-3.

3-1-1. HOW TO OPERATE THE LOADING MOTOR USING A DC VOLTAGE SUPPLY (See Fig.3-1-1)

1) Remove the power plug from the socket.
2) Remove the top cover, front cabinet assembly and bottom cover.
3) Supply a DC voltage in the range 5V between the MOTOR (+) wire and the MOTOR (–) wire on the CP-1 PWB assembly. To make the loading motor rotate in the PLAY or FF/REW direction, the positive terminal should be connected to the MOTOR (+) wire, and the negative terminal to the MOTOR (–) wire. To make it rotate in the EJECT direction, connect the positive terminal to the MOTOR (–) wire, and the negative terminal to the MOTOR (+) wire.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.

NOTE 1: When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2) in the direction of the arrow.

NOTE 2: When the loading motor stops rotating, following the completion of an operation such as tape loading or front unloading, switch off the DC voltage supply.

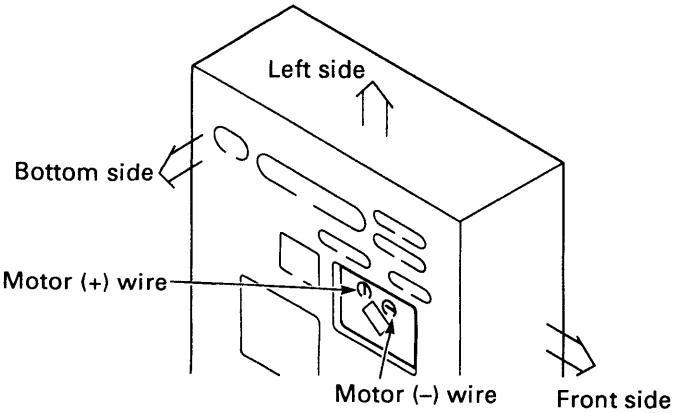


Fig.3-1-1

3-1-2. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-2)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
   When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

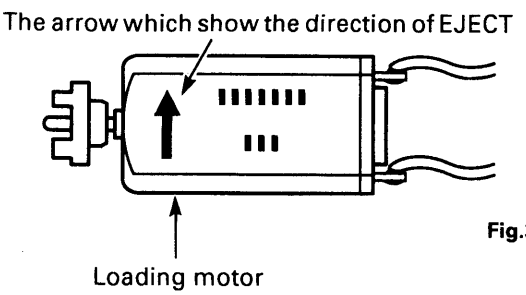


Fig.3-1-2

3-1-3. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the gear wheel 2.
3) If you turn the main cam anticlockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ③.
3) Remove the screw ②, the two screws ④, then remove the VM-1/VP-1 PWB assembly ⑤, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly and the bracket varies according to the model.
4) Remove the four screws ⑥ and the two screws ⑩, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑥ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

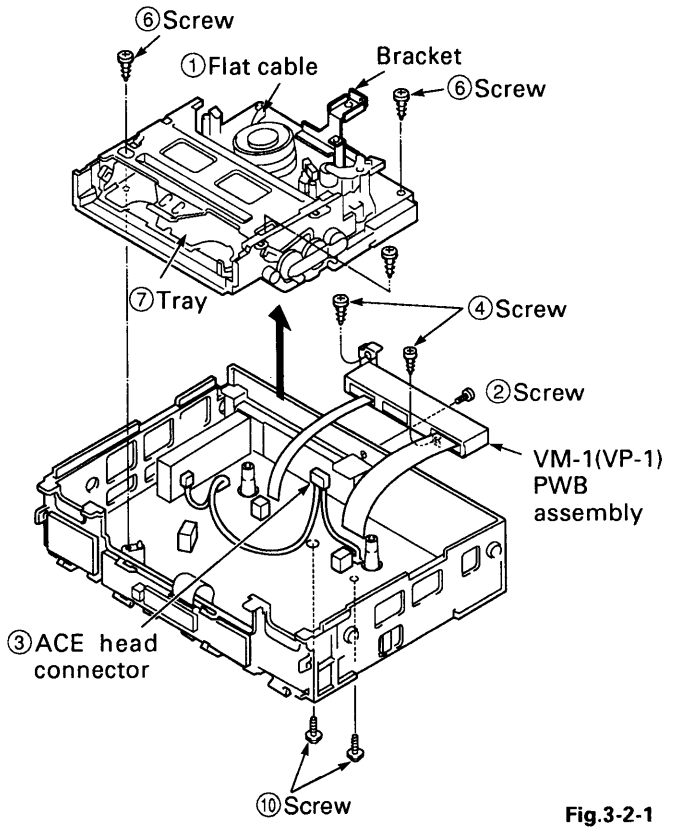


Fig.3-2-1

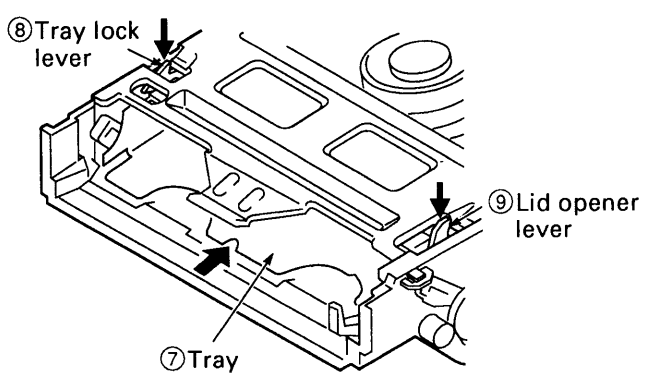


Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

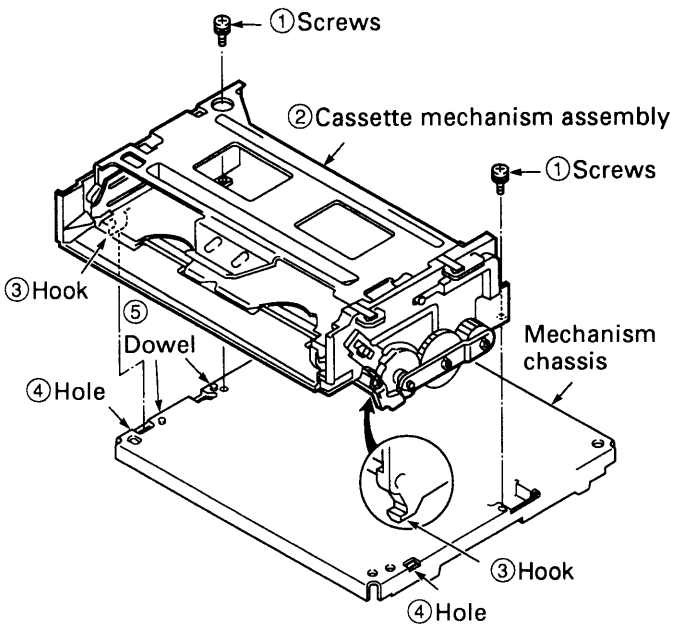


Fig.3-3-1

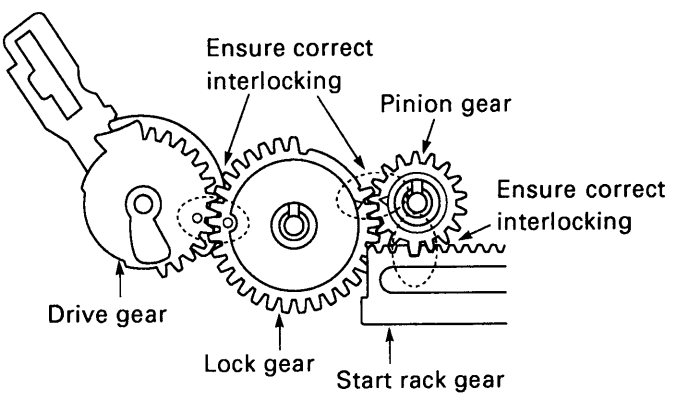


Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

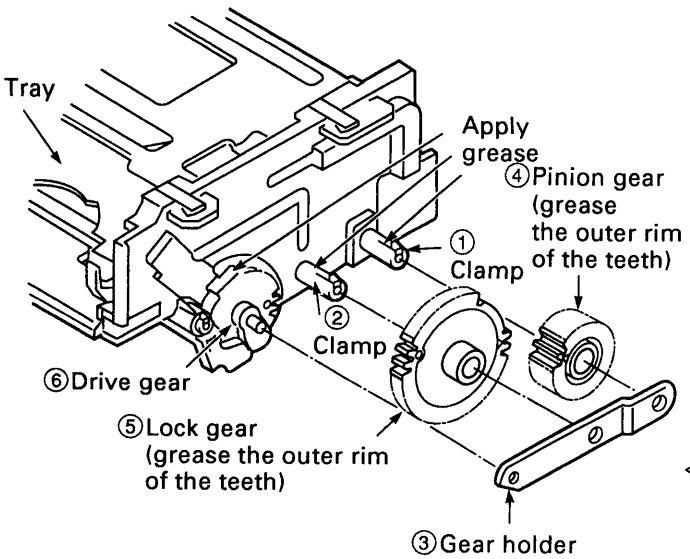


Fig.3-3-3

3-3-3. DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

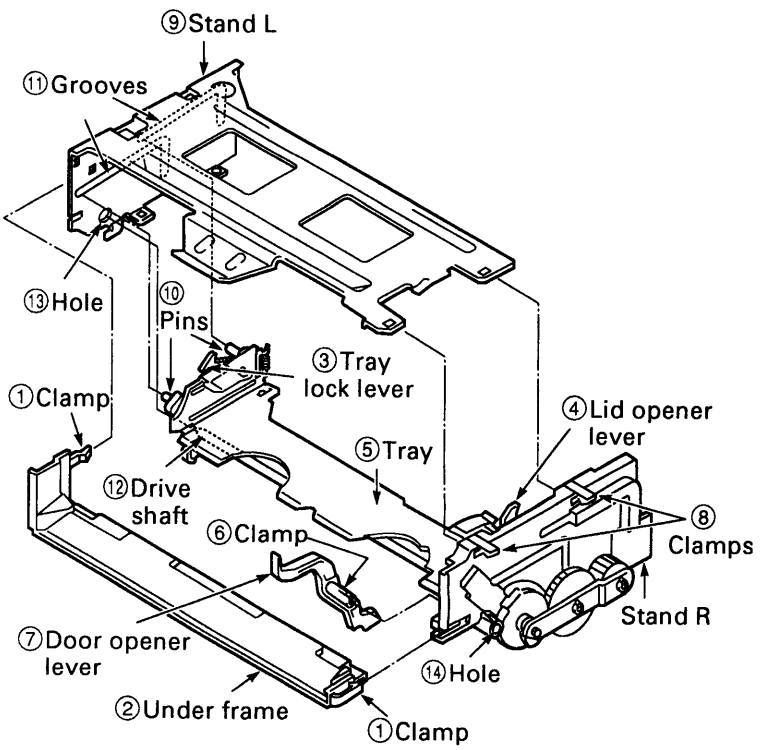


Fig.3-3-4

3-3-4. START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

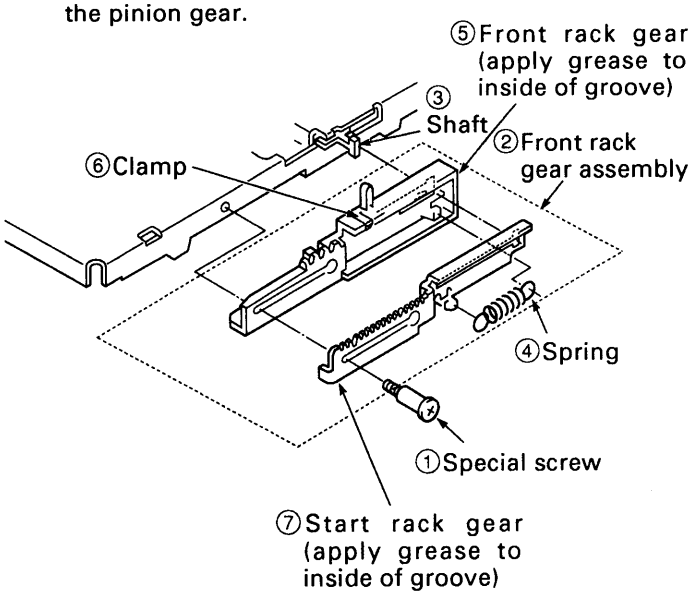

⑤Front rack gear (apply grease to inside of groove)
③ Shaft
②Front rack gear assembly
⑥Clamp
④Spring
①Special screw
⑦Start rack gear (apply grease to inside of groove)

Fig.3-3-5

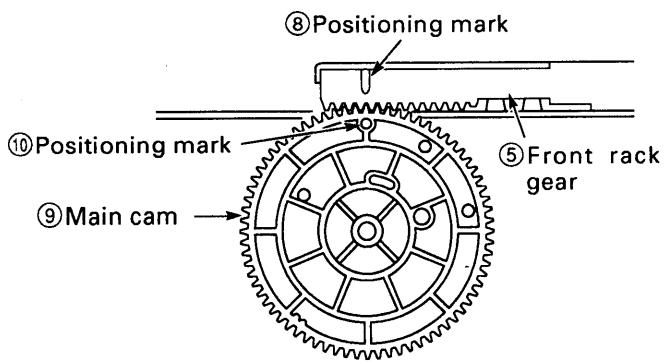


Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑ on the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

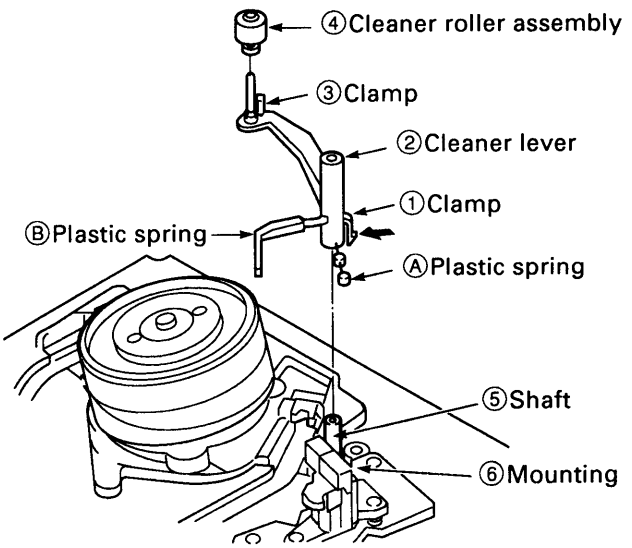


Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM) (See Figs. 3-5-1, 3-5-2, 3-5-3, 3-5-4)

There are two types of cylinders, one that can be disassembled into the upper cylinder (upper drum) and lower cylinder (lower drum) and one that cannot. For that type that cannot, replace the cylinder assembly as a whole.

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

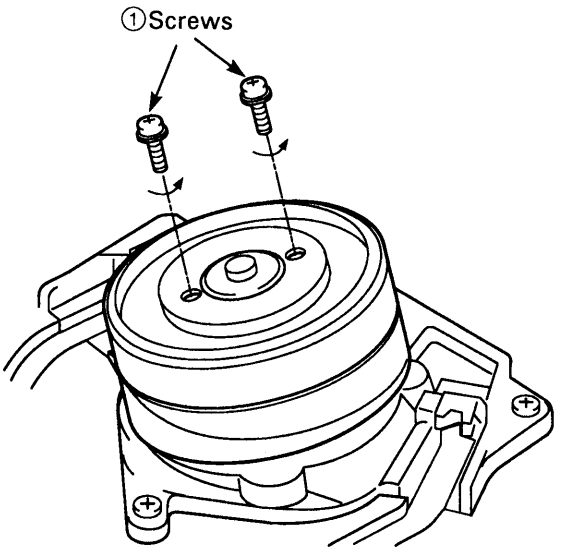


Fig.3-5-1

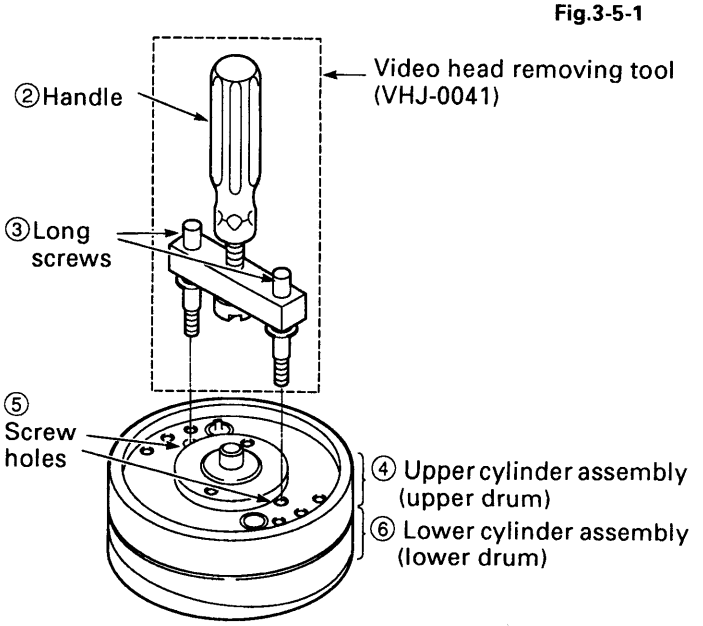


Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N2S-V, 2N4N, or 4H6N, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

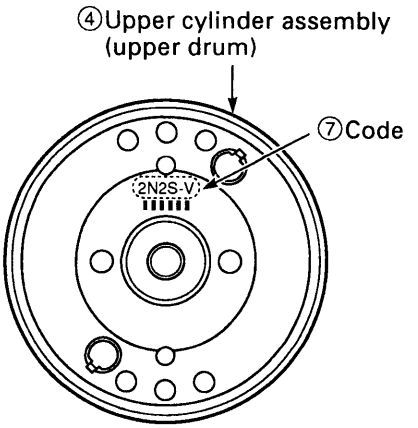
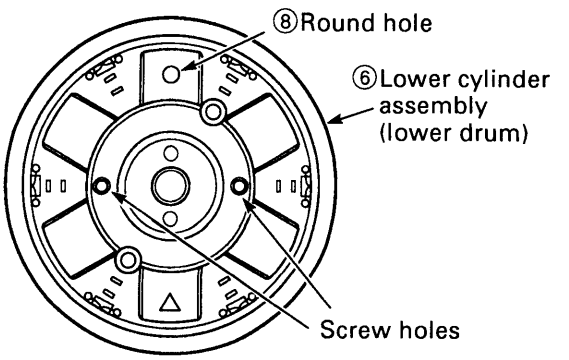


Fig.3-5-3

[EXCEPT FOR 2-HEAD MONAURAL MODELS]



[2-HEAD MONAURAL MODELS ONLY]

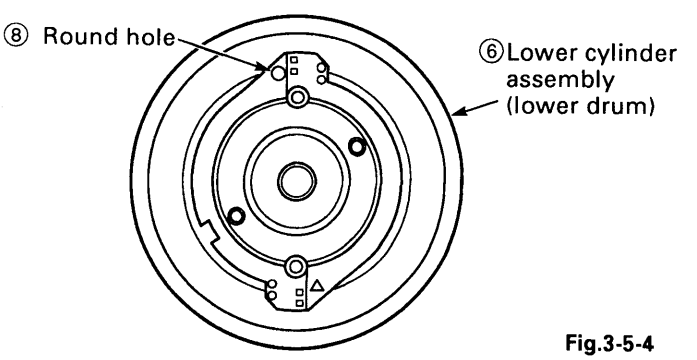


Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the two screws ① and take off the bracket ②. The bracket shape varies according to the model.
5) Remove the three screws ③. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the mounting cylinder ④ slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ④ (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ⑥ on the mounting cylinder ④ with the two holes ⑦ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

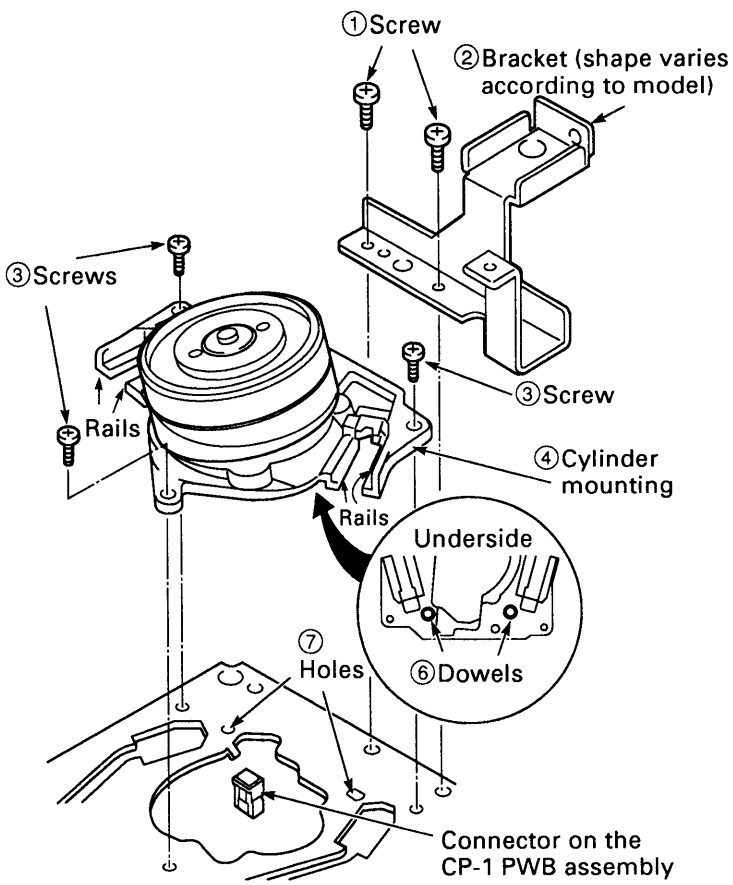


Fig.3-5-5

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-5-2 and remove the cylinder unit.
2) If you have removed the mechanism unit, remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑧.
4) Remove the three screws ⑤ and the stator ⑥.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑨ -beside the triangular mark on the rotor ④ - with the hole ⑩ in the rotor disk.
2. When fitting the screws ③ and ⑤, use the torque gauge screwdriver (VHJ-0014). give the screws a tightening torque of 3 kg/cm.
3. Align the dowel ⑪ on the cylinder earth assembly ② with the hole ⑫ in the chassis.
4. If you have removed the cylinder unit, after assembly, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

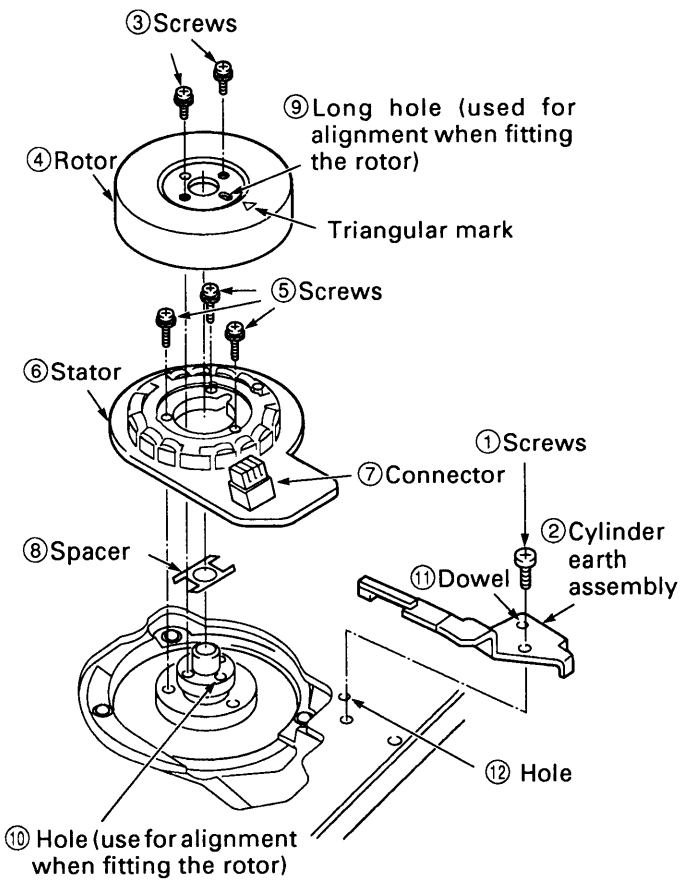


Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-2 and 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the cylinder mounting ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

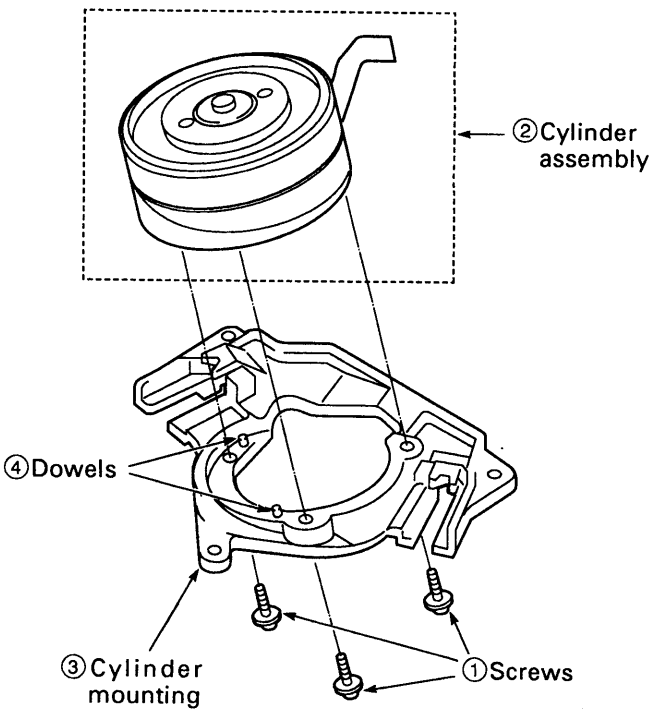


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ① and the audio R/P head assembly (ACE head) ②.

ASSEMBLY NOTES:

1. Align the hole ③ on the audio R/P head assembly (ACE head) with the pin ④ on the chassis unit.
2. After assembly, check that the clamp ⑤ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

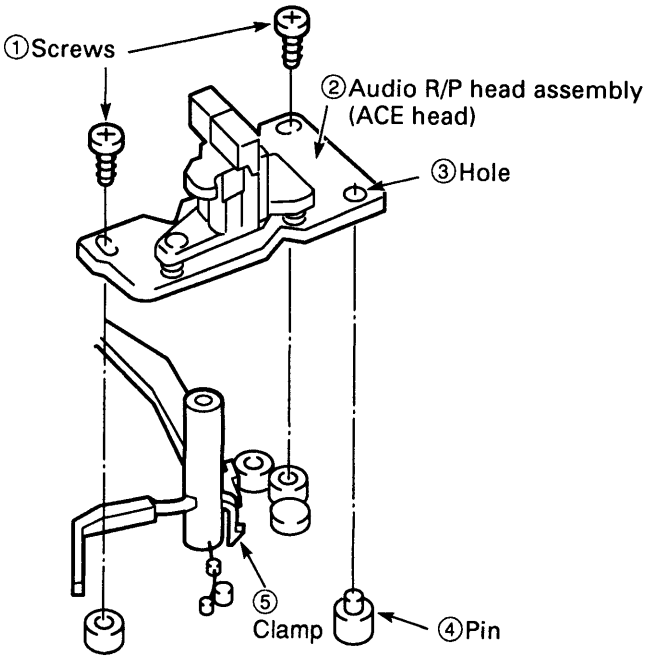


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

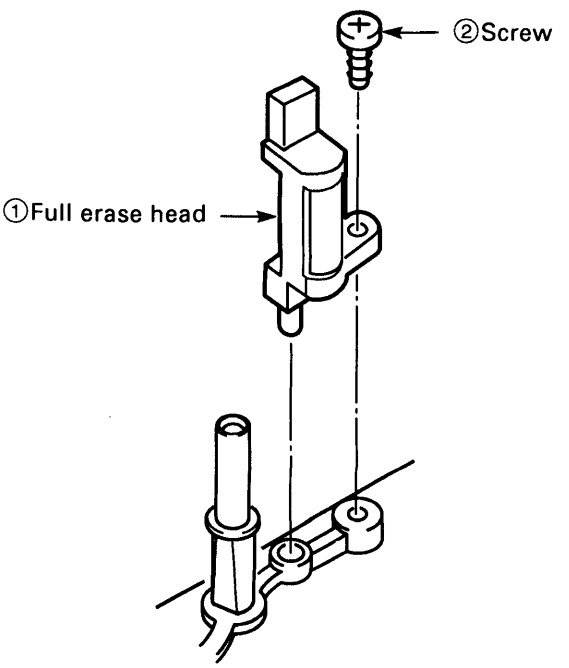


Fig.3-6-2

3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the two screws ②, then remove the harness mounting ①.
3) Remove the reel belt ③.
4) Remove the three screws ⑤ and the capstan motor ⑥.

ASSEMBLY NOTES:

1. Check that connector ④ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ⑤, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

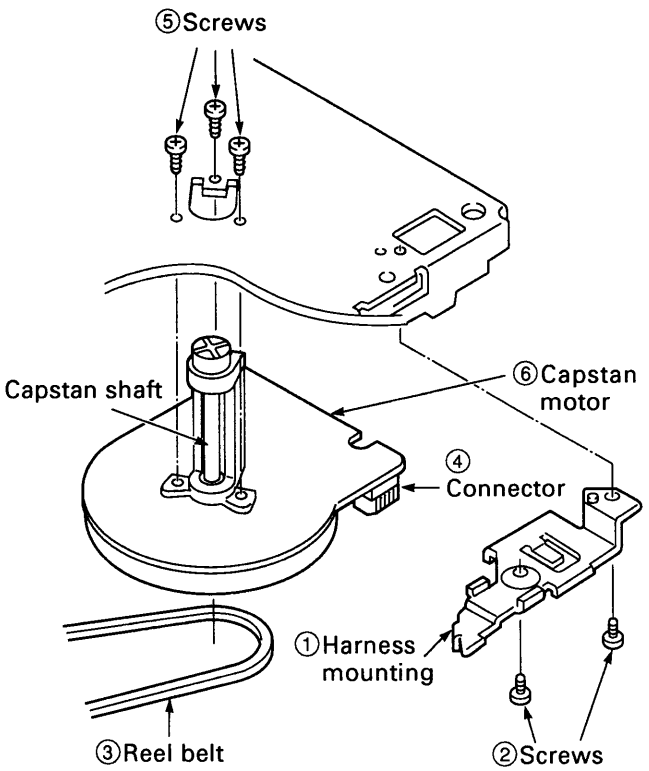


Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.

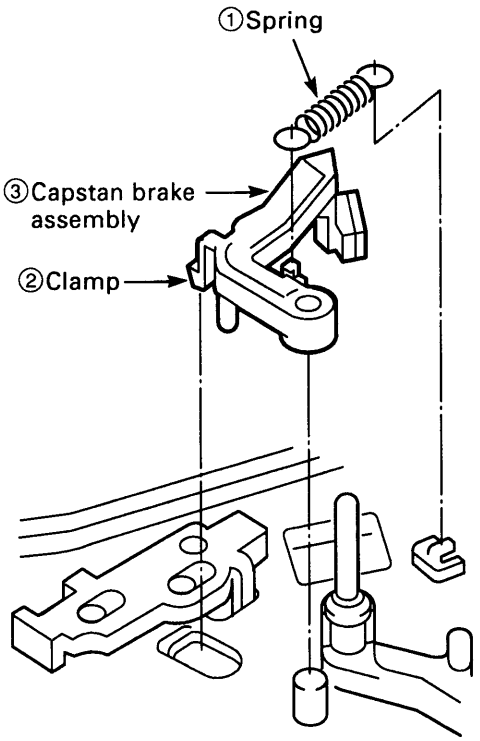


Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp③, and remove the loading motor assembly① and the damper④. Be careful not to exert too much force on the clamp③.
4) Remove the worm gear assembly⑤. To maintain performance, do not dis-assemble the worm gear assembly⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps③ and⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires②, adjust them so that they do not touch the friction gear assembly.

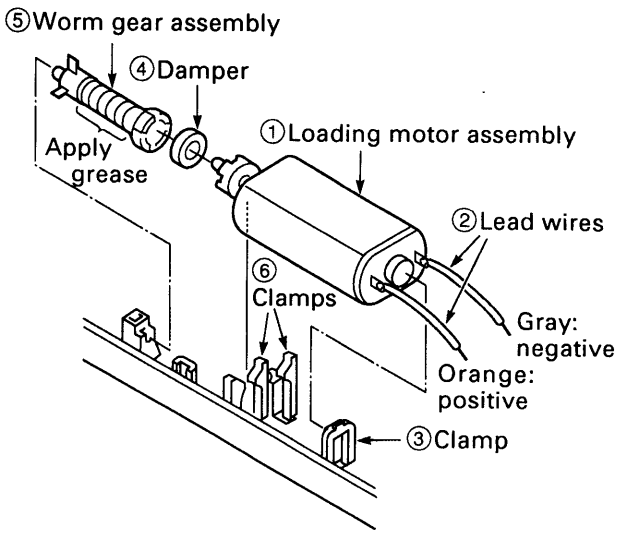


Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting②.
2) Remove the spring③, then remove the pinch roller lever assembly④ off the pinch lift mounting②. Before you do this, align the Indentation⑤ on the pinch roller lever assembly④ with the clamp⑥ on the pinch lift mounting②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

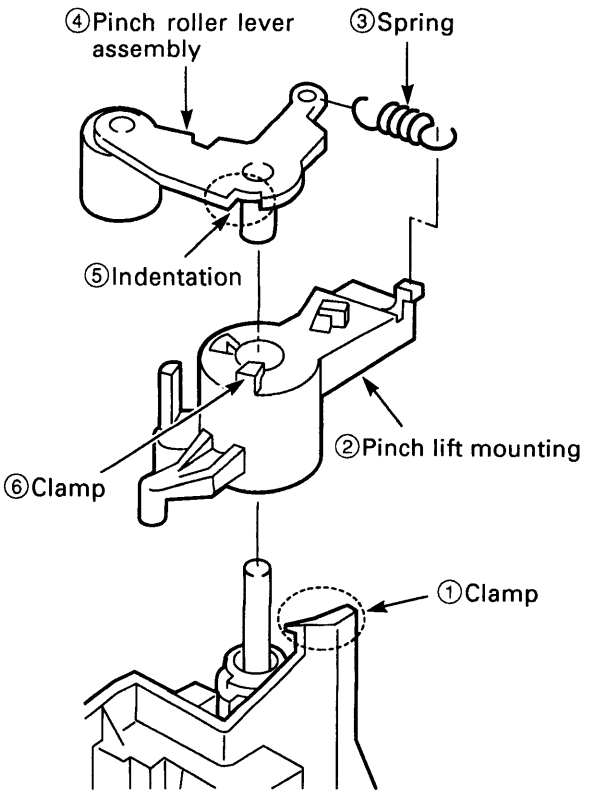


Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft ⑧ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

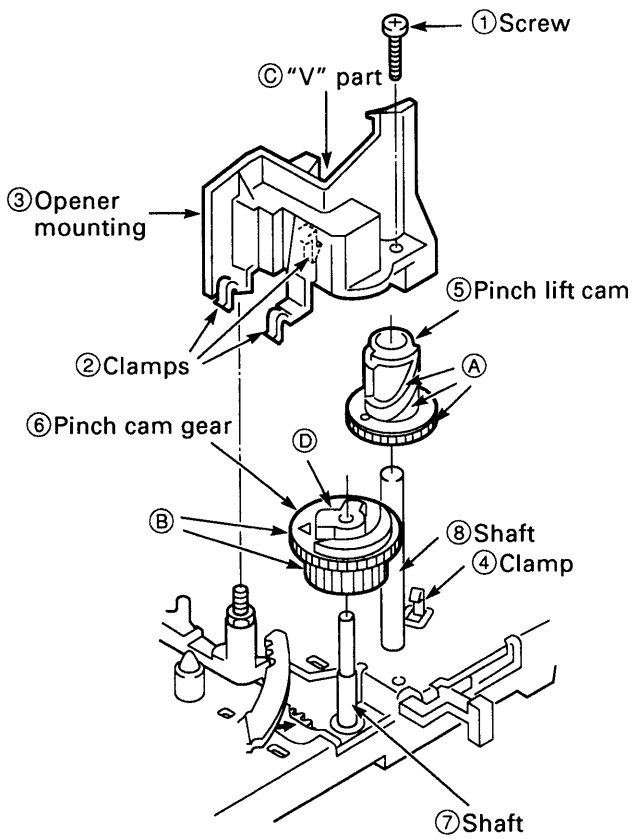


Fig.3-9-2

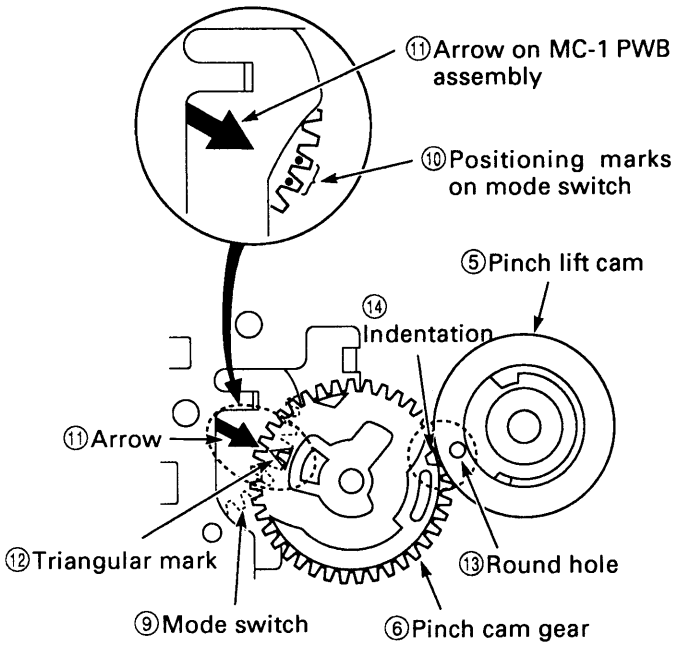


Fig.3-9-3

3-10. L GUIDE LEVER ASSEMBLY AND LOAD LEVER ASSEMBLY (See Figs.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2, then remove the pinch roller lever assembly and the opener mounting.
3) After removing the washer ④, remove the L guide act lever assembly ⑤.
4) Remove the special nut ⑥, then remove the load lever assembly ⑦ and the L guide lever spring ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ⑤ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑧ into the stopper ⑬ and load lever assembly ⑦ shown in Fig. A.
4) Put the pin ⑪ of the L guide act lever assembly into the cam groove ⑫ of the crescent slide.

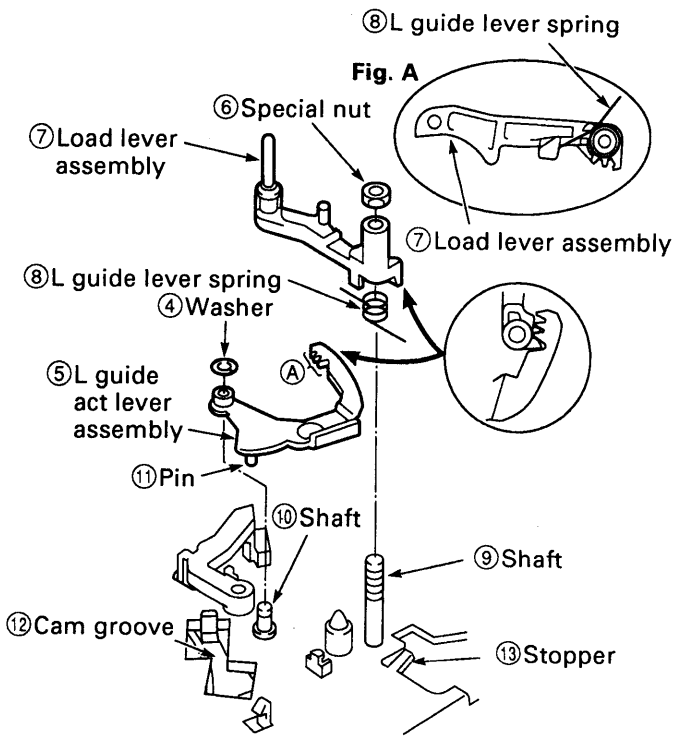


Fig.3-10-1

3-11. BT LEVER ASSEMBLY (See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①.
4) Remove the clamp ② on the underside of the mechanism chassis, then remove the BT lever assembly ③.
5) Remove the clamp ⑤ on the band brake assembly ④. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ③ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ③, be careful not to bend the stopper ⑥ or the S incline mounting assembly ⑦ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ③, as shown in Fig. B.
3. After assembly, make sure that the mountings on both ends of the band brake assembly ④ are positioned as shown in Fig. C.
4. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

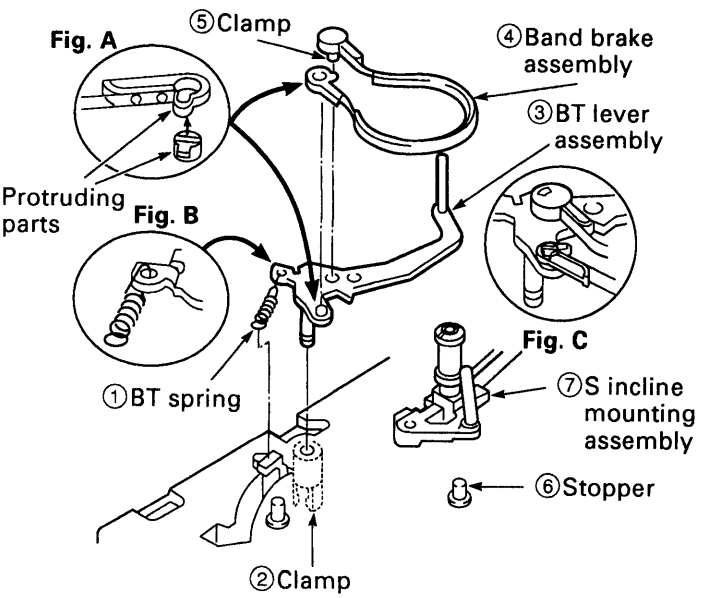


Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1. REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

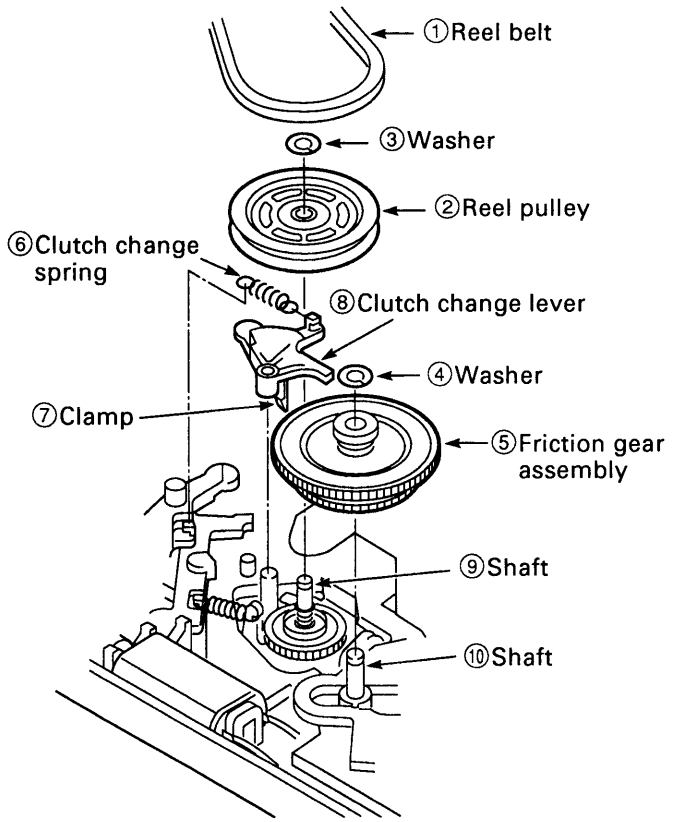


Fig.3-12-1

3-12-2. CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

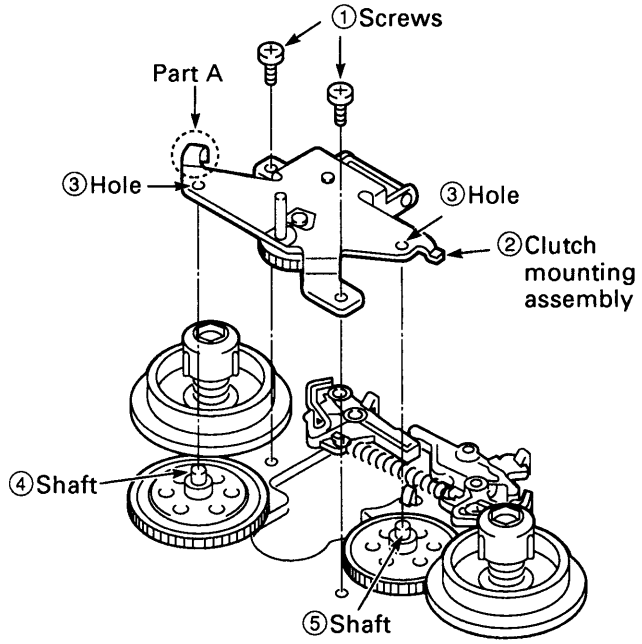


Fig.3-12-2

3-12-3. S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

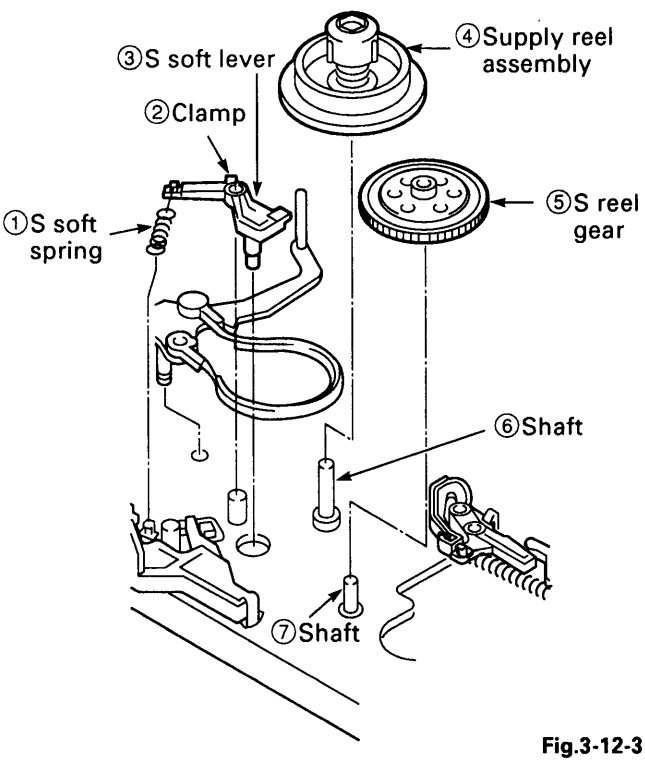


Fig.3-12-3

3-12-4. T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ②, then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

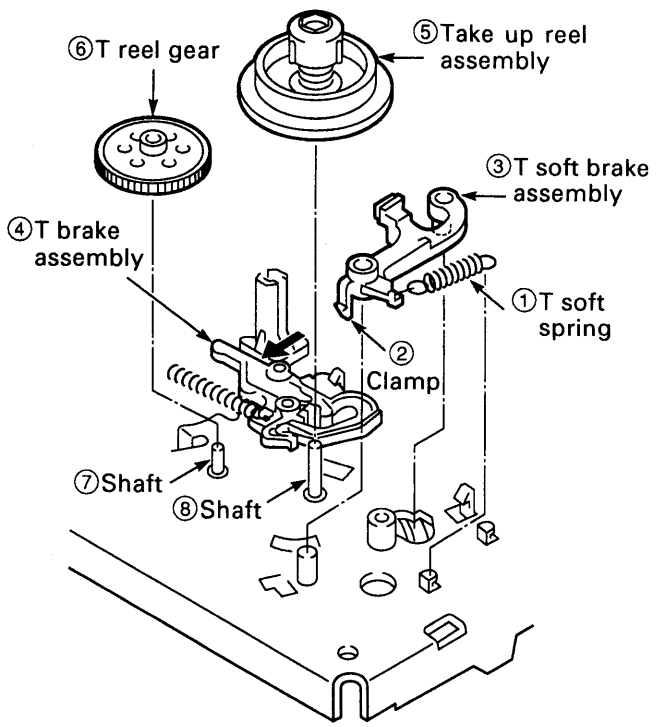


Fig.3-12-4

3-13. BRAKES

3-13-1. S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

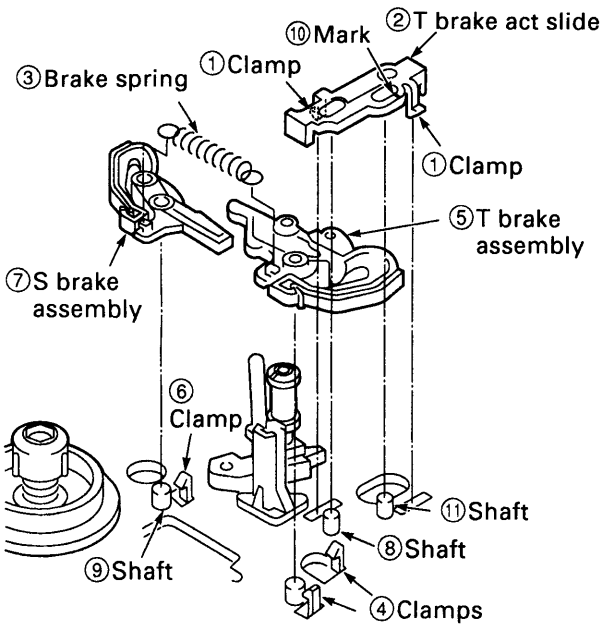


Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑬ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

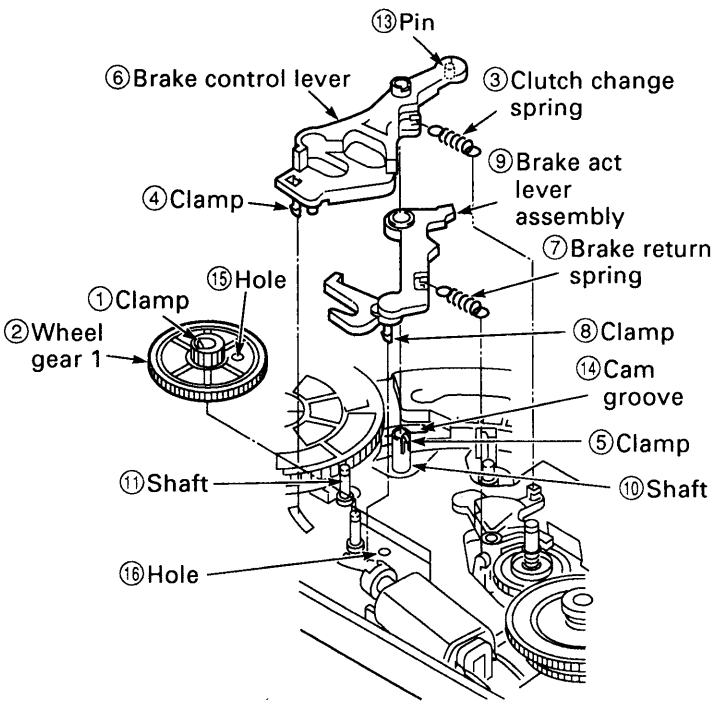


Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Press the BT spring lever assembly ② until it touches the pin ③, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ④ shown in Fig. 3-13-3, and to the BT spring lever assembly ② and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ② on the Shaft ④, hook the BT spring onto the clamp ⑤ and press it until it touches the pin ⑥.
3. Make sure that the clamps ⑦, ⑧ and ⑨ have snapped into the S brake act slide ①. Align the arrow ⑩ on the S brake act slide ① with the arrow ⑪ on the mechanism chassis.

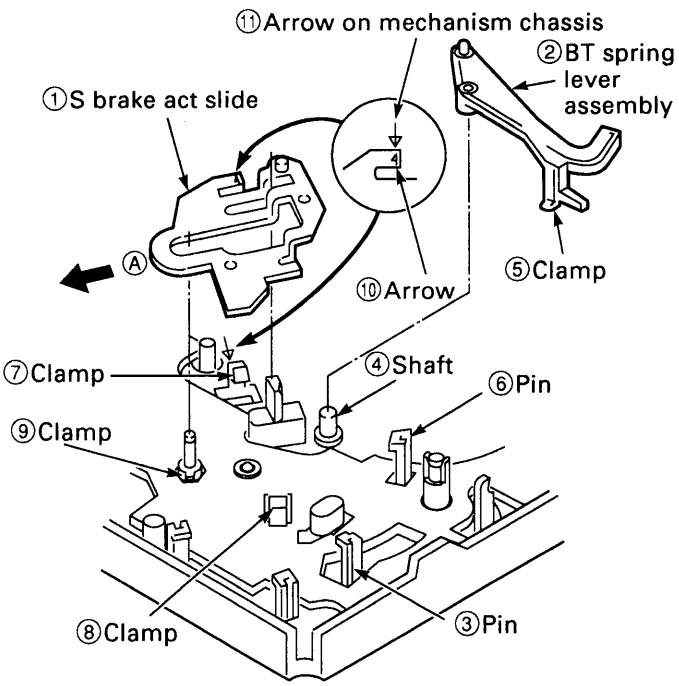


Fig.3-13-3

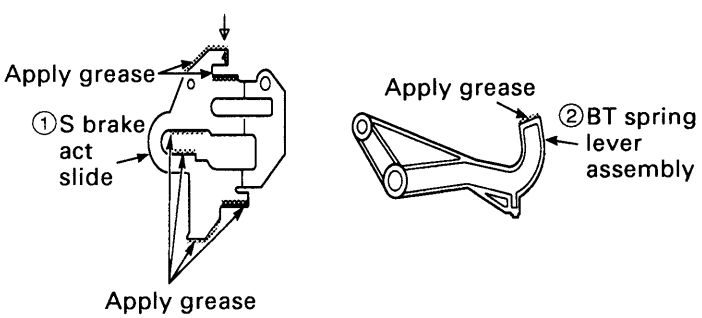


Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ② by unscrewing them anticlockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

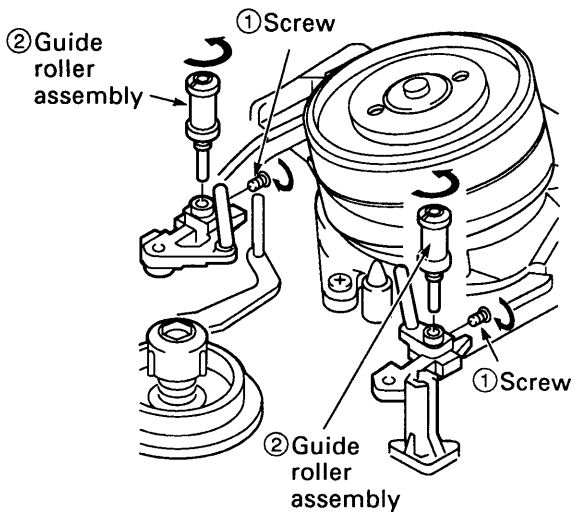


Fig.3-14-1

3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-5-2 and remove the cylinder unit.
3) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
4) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
5) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

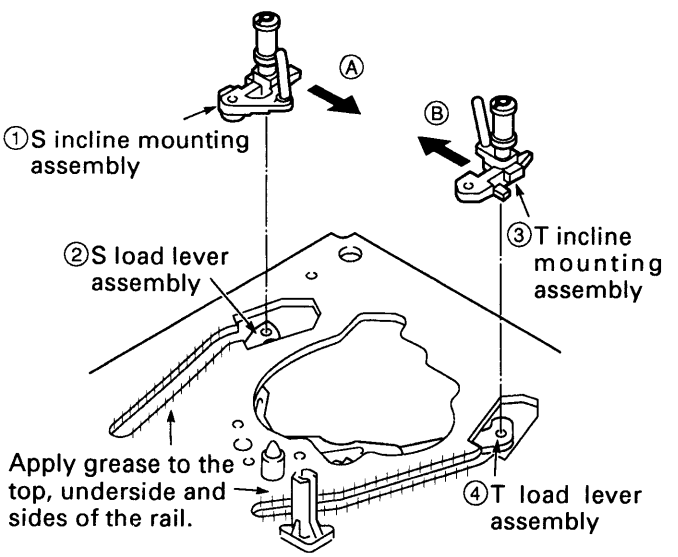

Ⓐ
Ⓑ
①S incline mounting assembly
②S load lever assembly
③T incline mounting assembly
Apply grease to the top, underside and sides of the rail.
④T load lever assembly

Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in Ⓐ Ⓑ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

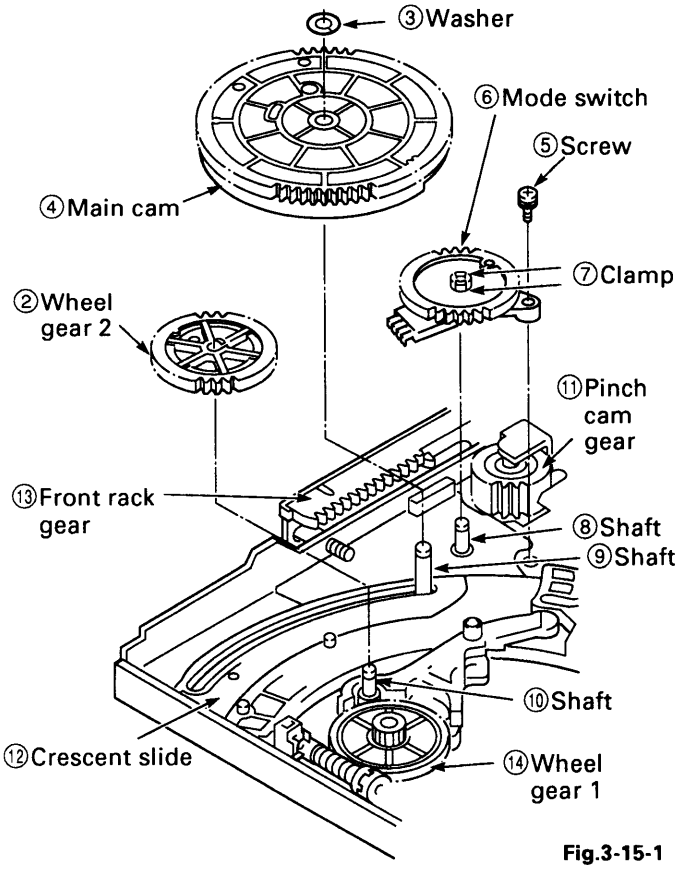


Fig.3-15-1

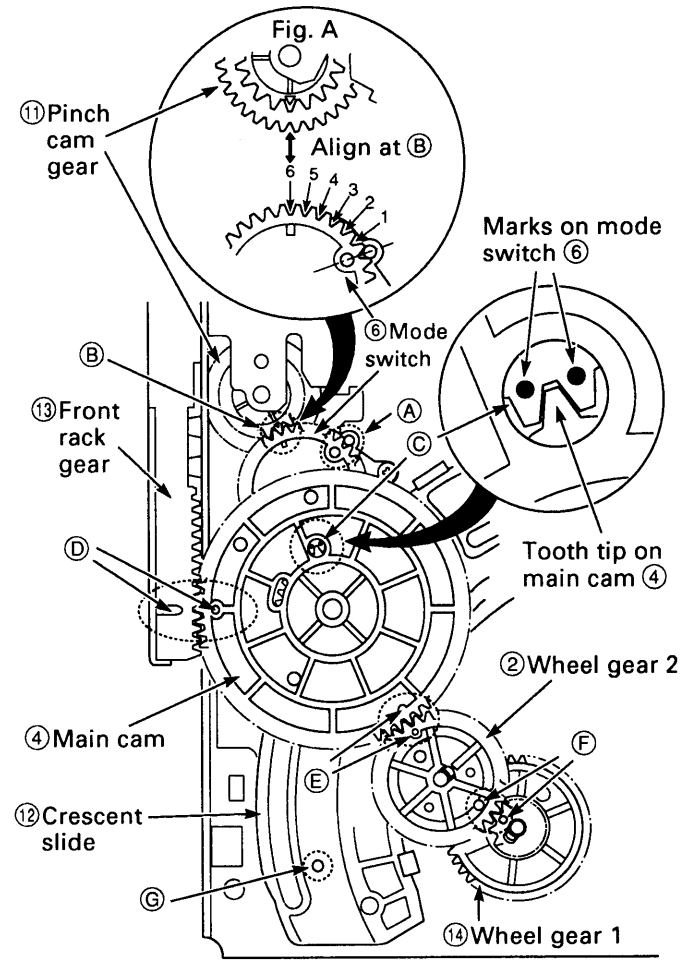


Fig.3-15-2

3-16. CRESCENT SLIDE (See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

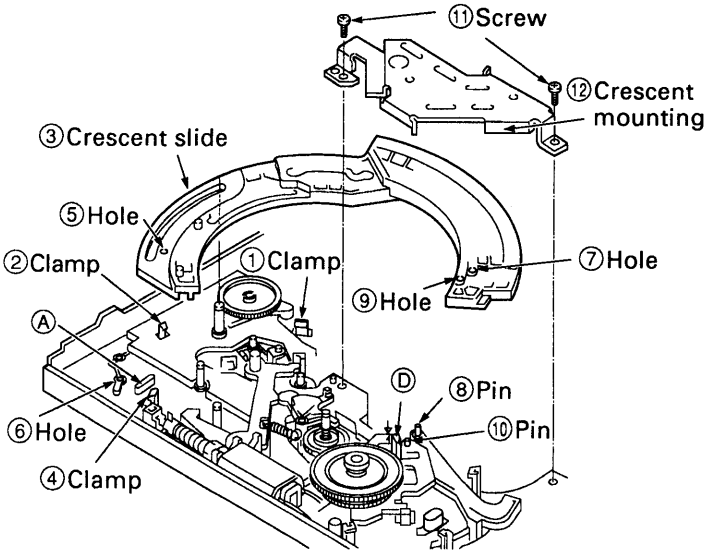


Fig.3-16-1

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp④, then align the hole⑤ with the hole⑥ in the mechanism chassis. When you do this, check that the hole⑦ is aligned with the pin⑧ on the BT spring lever assembly, and that the hole⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

Apply grease to the areas shown in ▭
• The places marked by dots should be greased particularly generously.

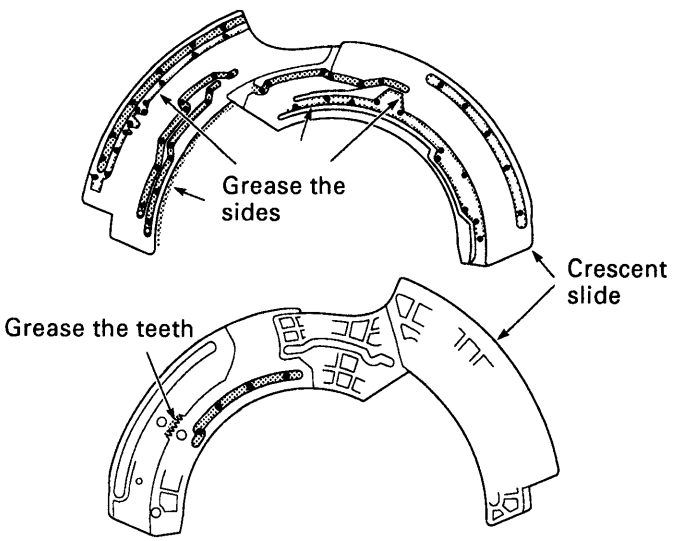


Fig.3-16-2

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

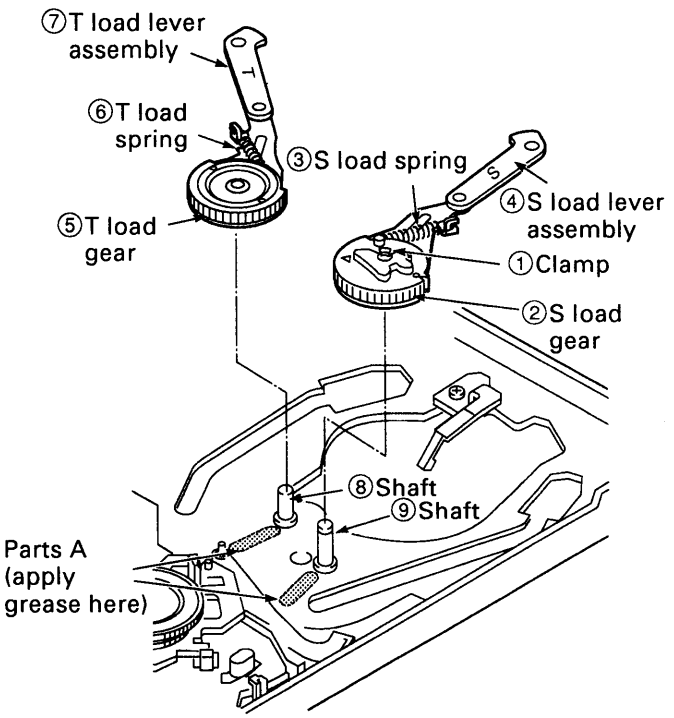
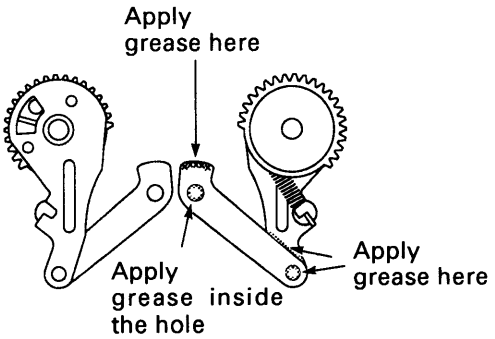


Fig.3-17-1

(T side)



(S side)

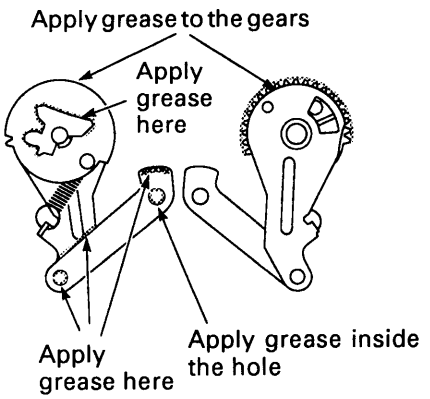


Fig.3-17-2

Fig. A: When tape loading is complete

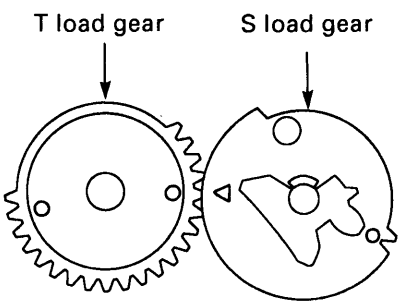


Fig. B: When tape unloading is complete

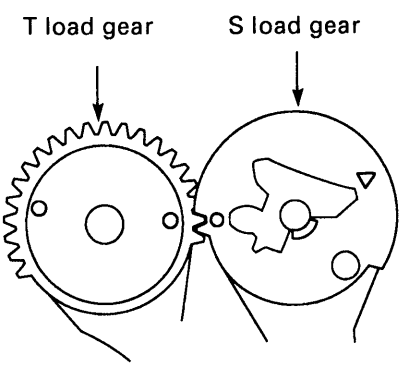


Fig.3-17-3

3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1 TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photo-receptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④. Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.

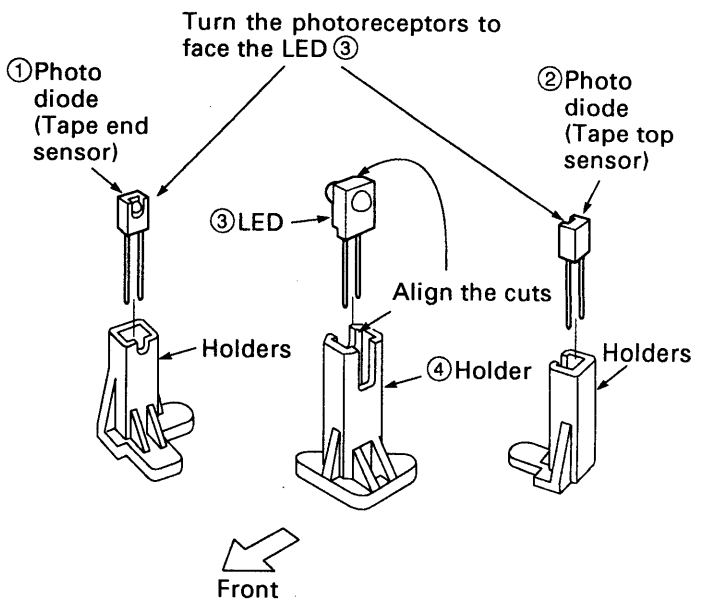


Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diode (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.

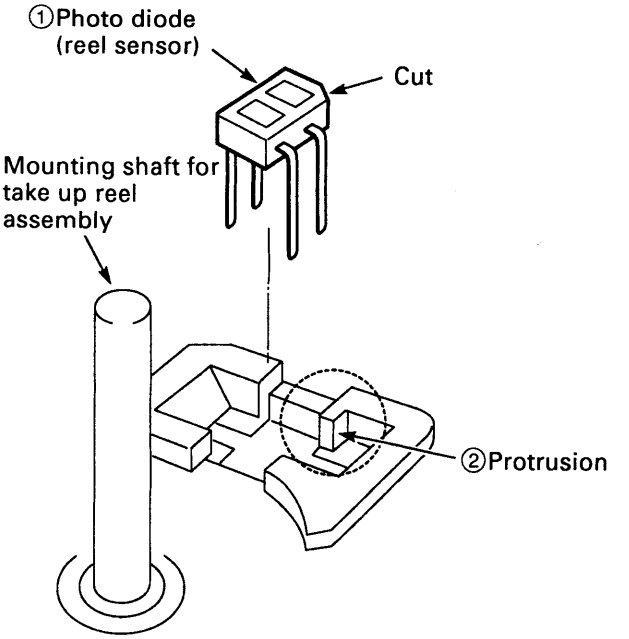


Fig.3-18-2

3-18-3. EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.

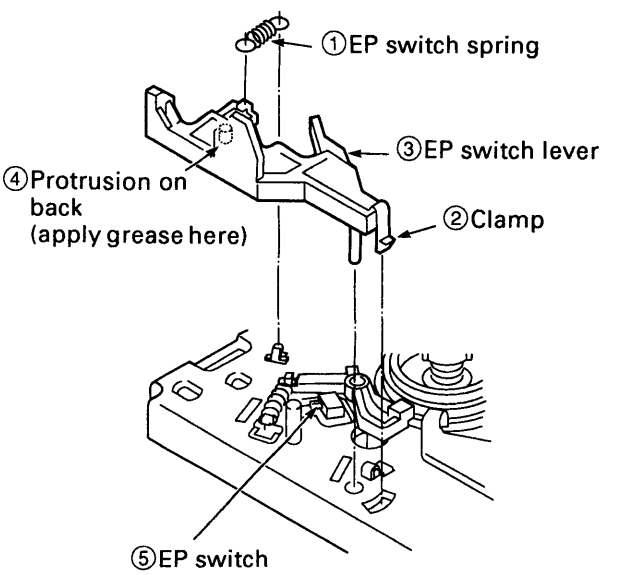


Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:

1. The measurements must be taken without any incandescent light or daylight.

2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm. Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.

3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).

4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 80 and 140g/cm (lock torque).

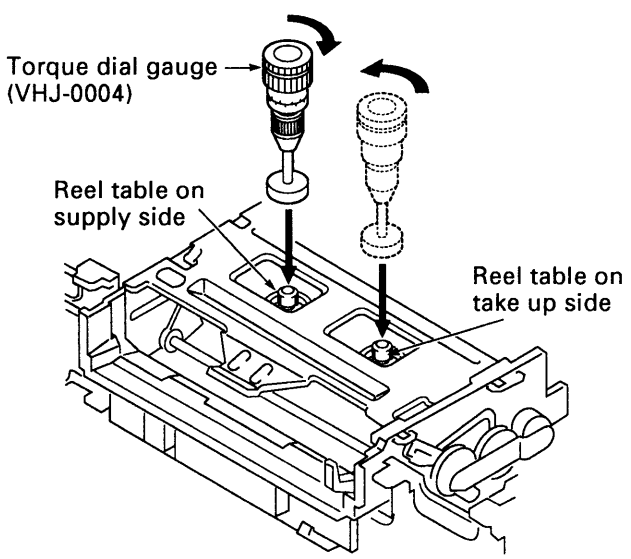


Fig.4-1-1

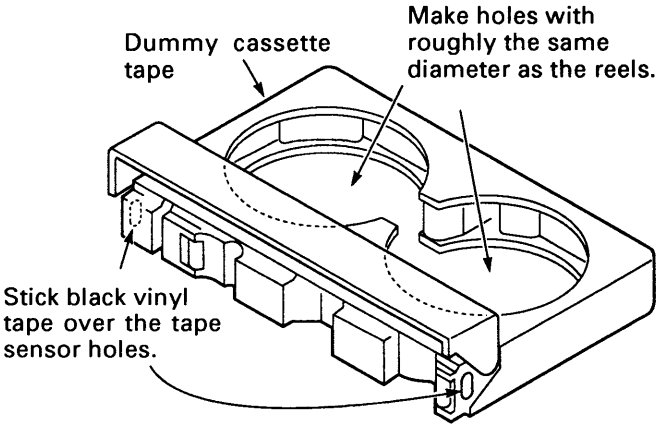


Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1. BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).

2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.

3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

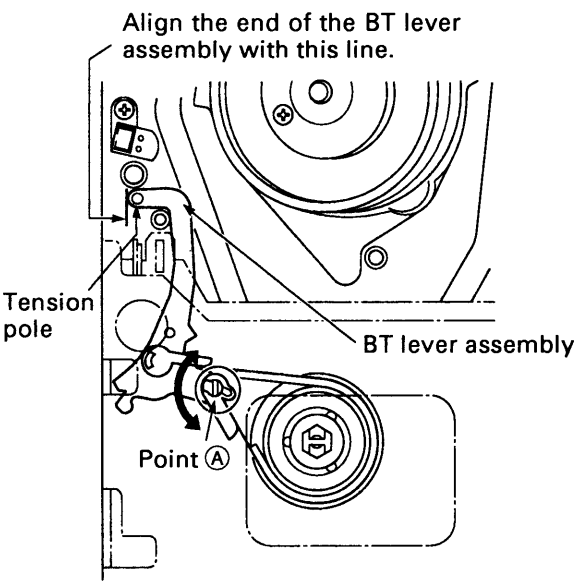


Fig.4-2-1

4-2-2. CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.

2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

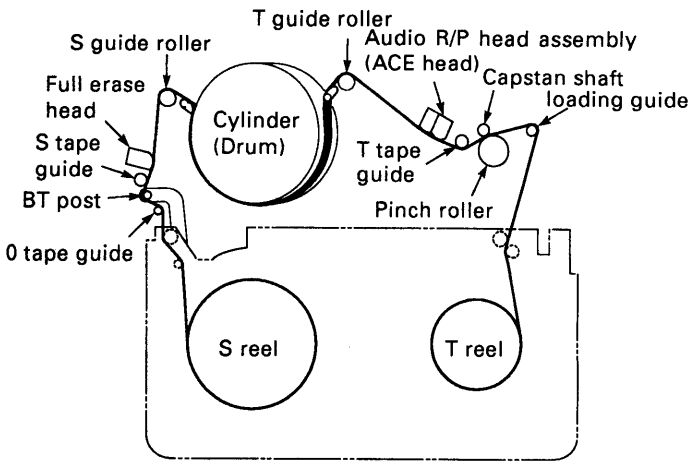


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

PAL: For models with 625 scanning lnes and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE:The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2. LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0102)③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly① touches the height adjustment tool (VHJ-0102)③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° anticlockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240) and switch to PLAY mode. Check that when you do this, no scratches appear on the upper or lower edges of the tape. If scratches do appear, re-adjust the height.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0102) when seen from directly overhead.

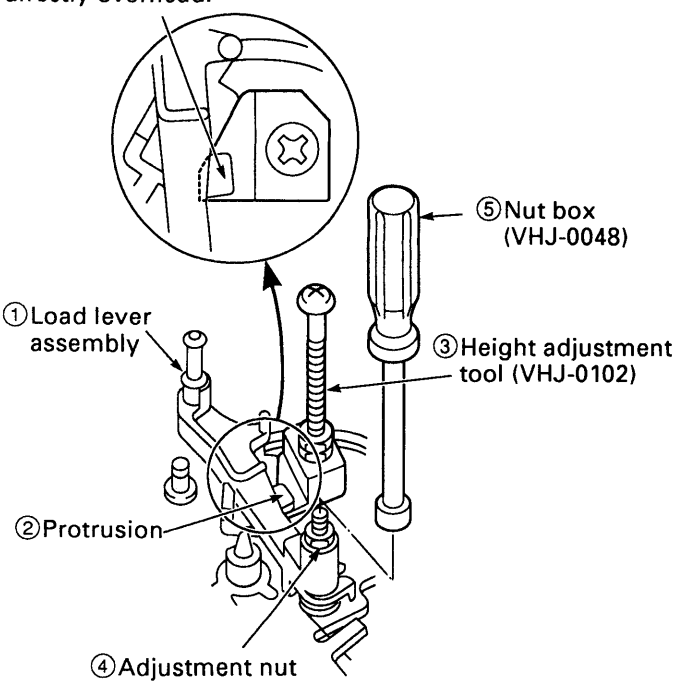


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Play the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them anticlockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Press the tracking button (Channel –), and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° anticlockwise.
3) Adjust the T guide roller.
   ① Press the tracking button (channel –) and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from F-SEARCH to PLAY or from R-SEARCH to PLAY. If it does fluctuate, repeat steps 3) and 4).

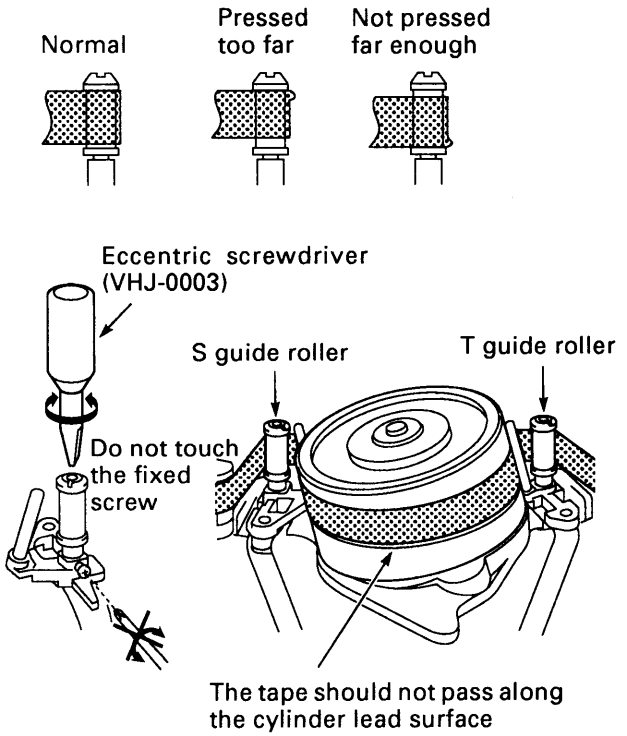

Normal
Pressed too far
Not pressed far enough
Eccentric screwdriver (VHJ-0003)
S guide roller
T guide roller
Do not touch the fixed screw
The tape should not pass along the cylinder lead surface

Fig.4-3-3

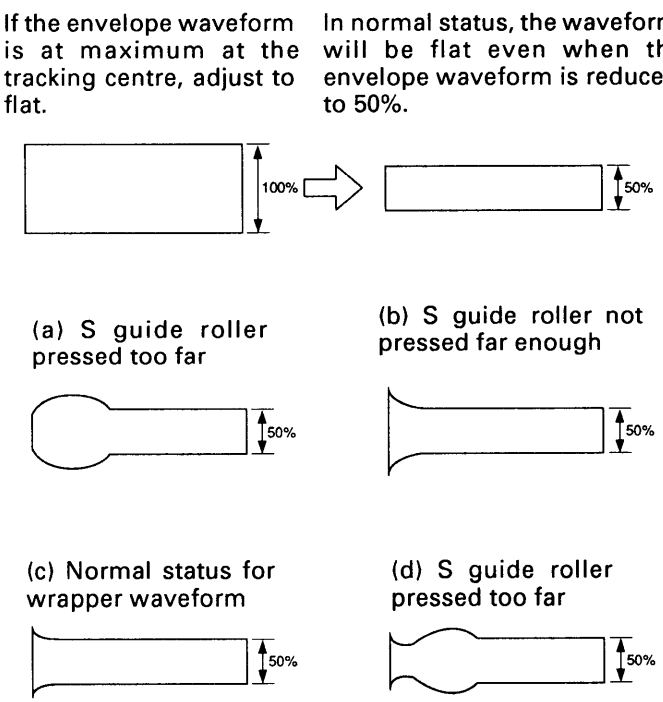

If the envelope waveform is at maximum at the tracking centre, adjust to flat.
In normal status, the waveform will be flat even when the envelope waveform is reduced to 50%.
100%
50%
(a) S guide roller pressed too far
(b) S guide roller not pressed far enough
50%
50%
(c) Normal status for wrapper waveform
(d) S guide roller pressed too far
50%
50%

Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Azimuth adjustment (See Fig.4-3-5)

1) Play the alignment tape (NTSC: VHJ-0005, PAL: VHJ-0008) and observe the waveform of the audio output, using an oscilloscope.
2) Loosen the height adjustment screw in the counter-clockwise direction and decrease the amplitude of the audio output waveform. In this state, tighten the screw in the clockwise direcion and maximize the amplitude. Slightly tighten the screw further in the clockwise direction and decrease the amplitude, and then loosen it slowly in the counterclockwise direcion until the amplitude starts to reach the maximum.
3) Set the amplitude of the audio output waveform to maximum by rotating the azimuth adjustment screw.
4) Make sure that the tape edge is running between the top of the audio head and the bottom of the control head.
   Gaps A and B should be roughly equal.

NOTE:Rotate the adjustment screw with a slotted screwdriver. Do not apply excessive force vertically. As the height adjustment screw also adjusts tilt, rotate it slowly. Do not rotate it excessively. And apart from the this screw, and height adjustmment screw, the screws is precisely adjusted before shipment from the factory, and should not be tampered with. Tampering with these screws can lead to scratching of the tape and other problems.

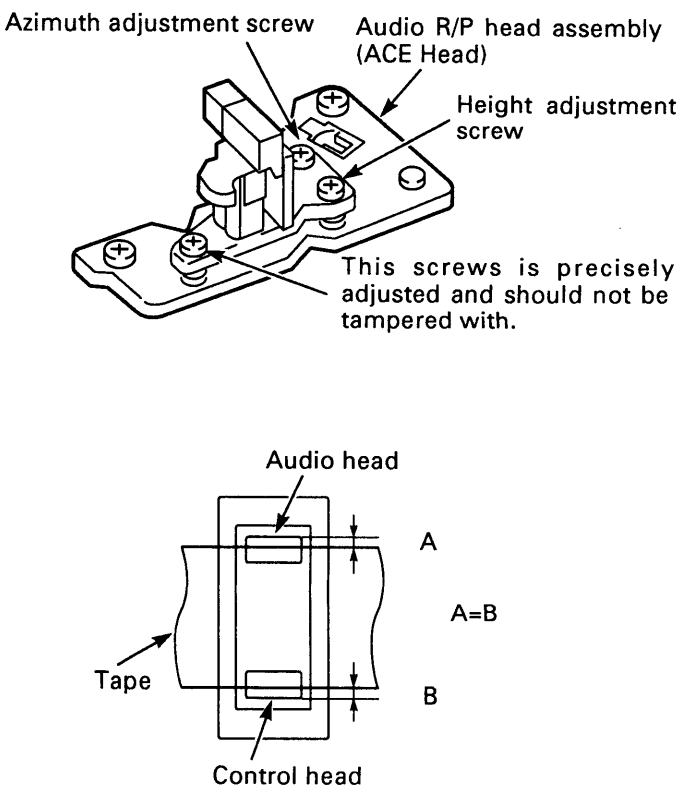


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (channel + and channel –) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VHJ-0007 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (channel + and channel –) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the channel – button the messages "T -: " and "T - -: " will appear, while if you keep pressing the channel + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

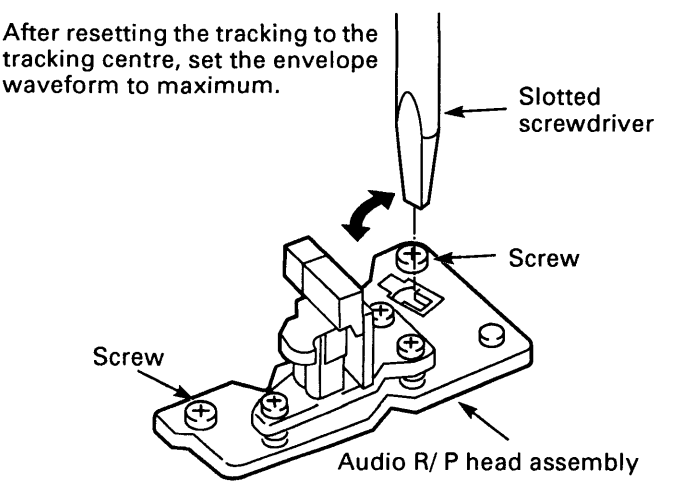

After resetting the tracking to the tracking centre, set the envelope waveform to maximum.
Slotted screwdriver
Screw
Screw
Audio R/ P head assembly

Fig.4-3-6

4-3-5. CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-00 09) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to R-SEARCH or from R-SEARCH to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, F-SEARCH, R-SEARCH or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, F-SEARCH or R-SEARCH modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

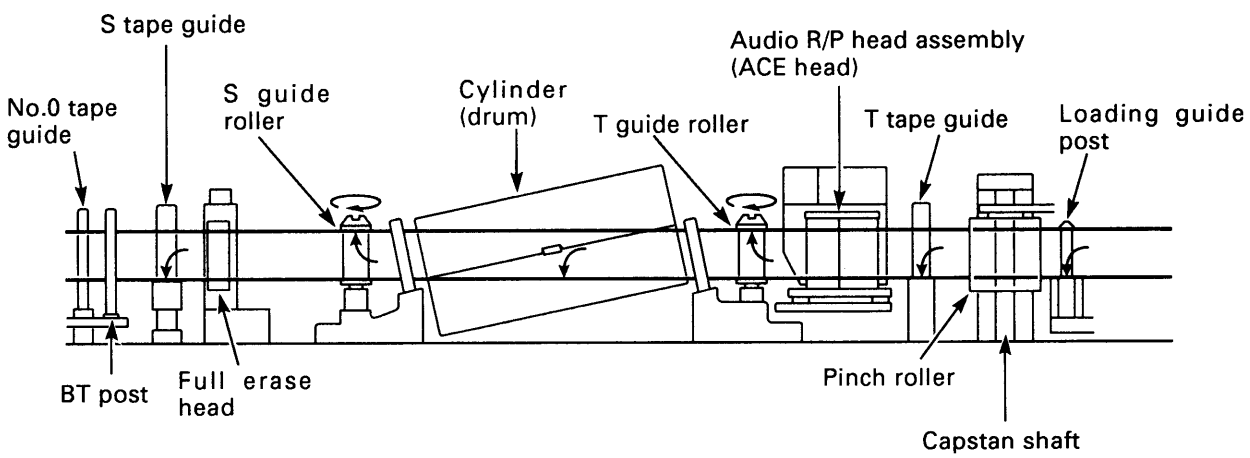


Fig.4-3-7

Jan./'95/11500 Printed in Japan

SANYO Electric Co., Ltd.
Osaka, Japan

FILE NO.

SUPPLEMENT SERVICE TECHNICAL INFORMATION

SANYO

FISHER

Video Cassette Recorder

V95 II MECHANISM

Use this supplement together with the V95 I mechanism manual (Reference No. MM531433) of the Service Technical Information published in 1995.

Please see other materials with Reference No. given in table below.

Materials	Model No.	Reference No.
Basic Service Technical Information	V95 I Mechanism	MM531433

VHS
PAL SECAM NTSC

Contents

Outline 2
3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) 2
3-5-4. CYLINDER ASSEMBLY 3
3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES 3

Outline

The V95 II mechanism has the same basic structure as the V95 I mechanism, but the part for mounting its cylinder assembly has been changed.

The cylinder assembly of the V95 I mechanism requires a die casting cylinder mounting to be mounted. In the V95 II mechanism, the cylinder assembly can mounted directly to the mechanism chassis due to changes made in the chassis form.

As the V95 II mechanism does not require a cylinder mounting, its cylinder assembly and S • T incline mounting assemblies are replaced differently from the V95I mechanism.
This manual describes only the methods for replacing the cylinder assembly and S • T incline mounting assemblies. For other information, refer to the Service Technical Information (Reference No. MM531433).

[Page 13]

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑧.
4) Remove the three screws ⑤ and the stator ⑥.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑨ -beside the triangular mark on the rotor ④ - with the hole ⑩ in the rotor disk.
2. When fitting the screws ③ and ⑤, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑪ on the cylinder earth assembly ② with the holes ⑫ in the chassis.
4. After fitting the mechanism unit, do the switching position adjustment of the servo circuit.

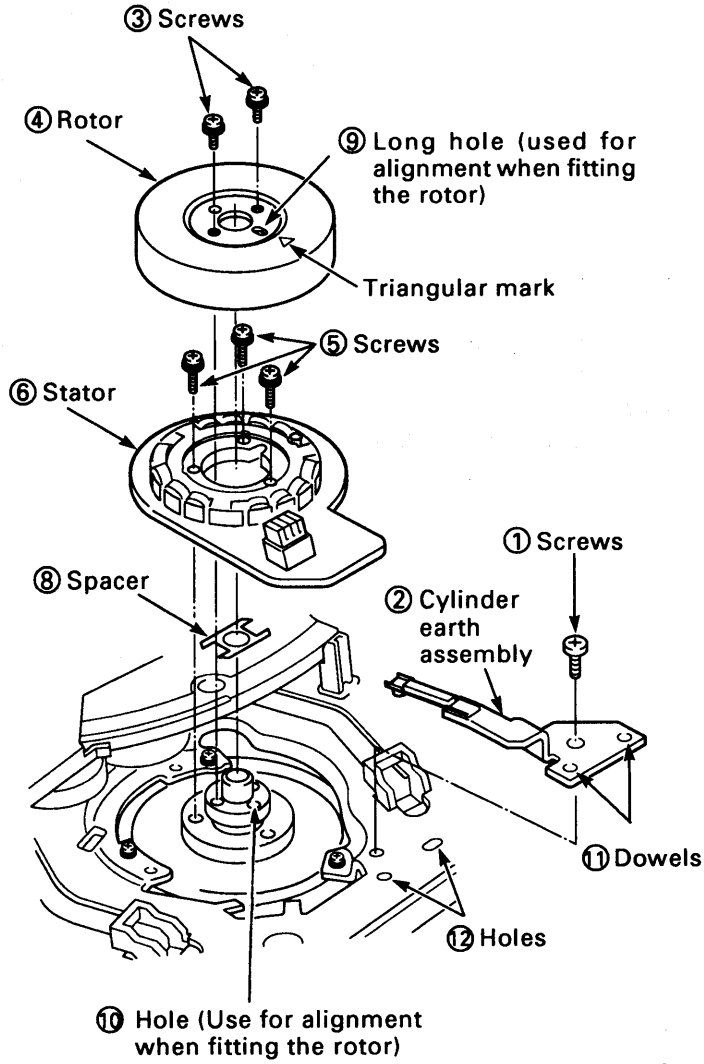


Fig.3-5-6

[Page 14]

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the mechanism chassis ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

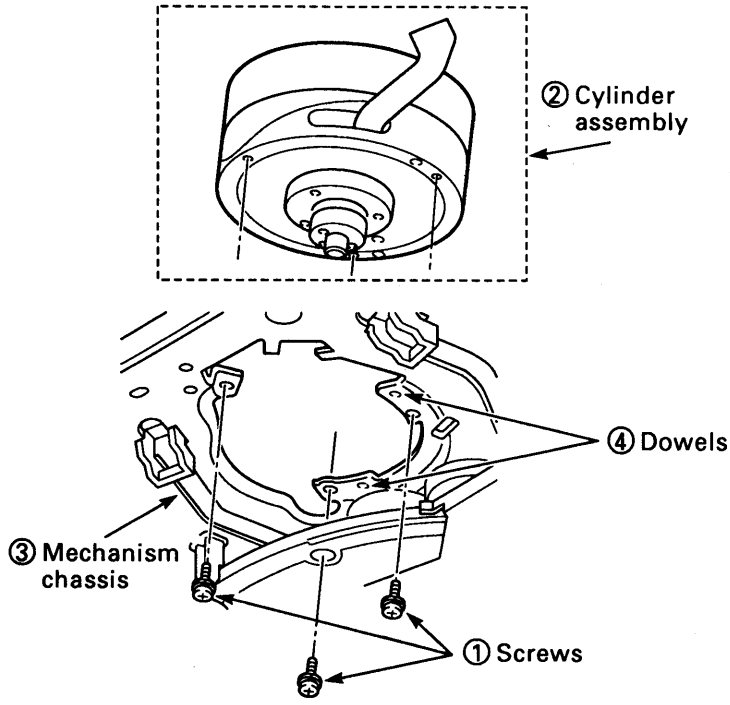


Fig.3-5-7

[Page 22]

3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-4 and remove the cleaner lever.
3) Remove the four screws ⑤ and take off the two catcher mountings ⑥.
4) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
5) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
6) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. Aline the dowels on the catcher mounting ⑥ with the holes ⑦ in the mechanism chassis.
4. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

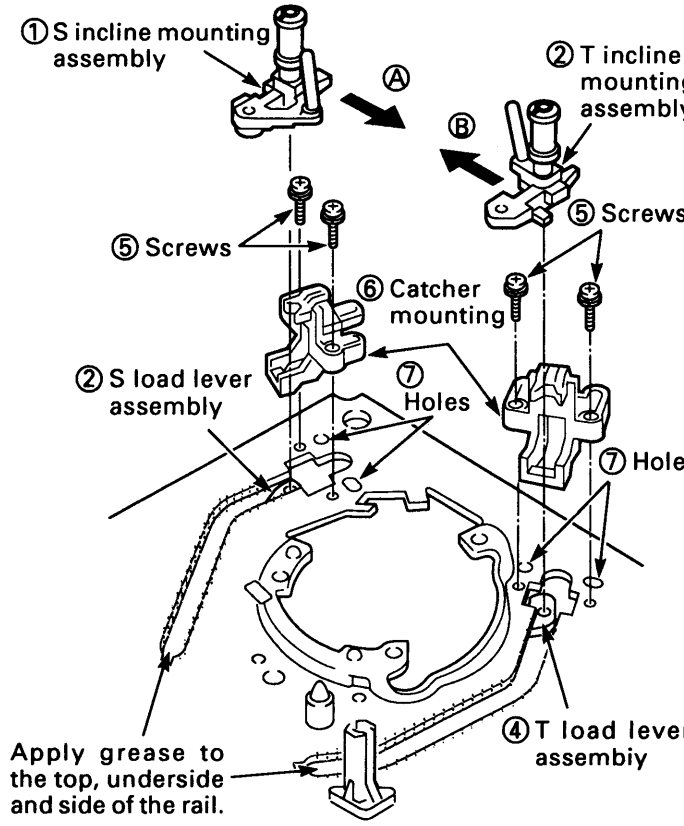


Fig.3-14-2

Nov./'95/11500 Printed in Japan

SANYO Electric Co., Ltd.
Osaka, Japan

FILE NO.

SUPPLEMENT SERVICE TECHNICAL INFORMATION

SANYO

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V95 II MECHANISM

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The V95 II mechanism has the same basic structure as the V95 I mechanism, but the part for mounting its cylinder assembly has been changed.

The cylinder assembly of the V95 I mechanism requires a die casting cylinder mounting to be mounted. In the V95 II mechanism, the cylinder assembly can mounted directly to the mechanism chassis due to changes made in the chassis form.

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[Page 13]

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3) Remove the two screws ③, the rotor ④ and the spacer ⑧.
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ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑨ -beside the triangular mark on the rotor ④ - with the hole ⑩ in the rotor disk.
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4. After fitting the mechanism unit, do the switching position adjustment of the servo circuit.

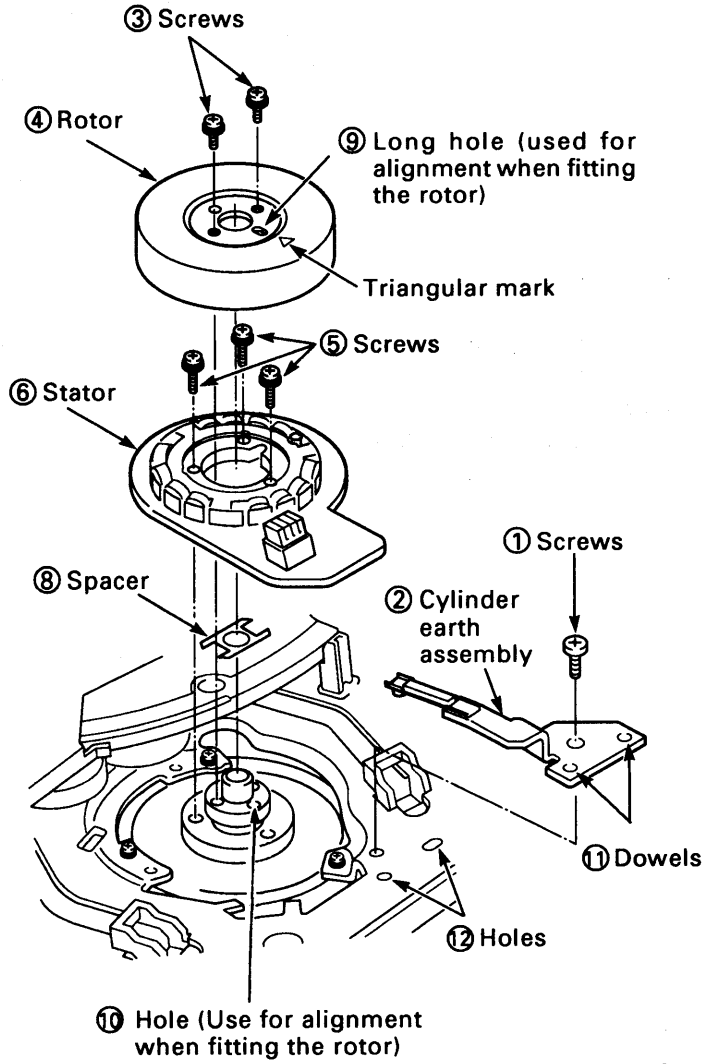

Fig.3-5-6

[Page 14]

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

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ASSEMBLY NOTES:

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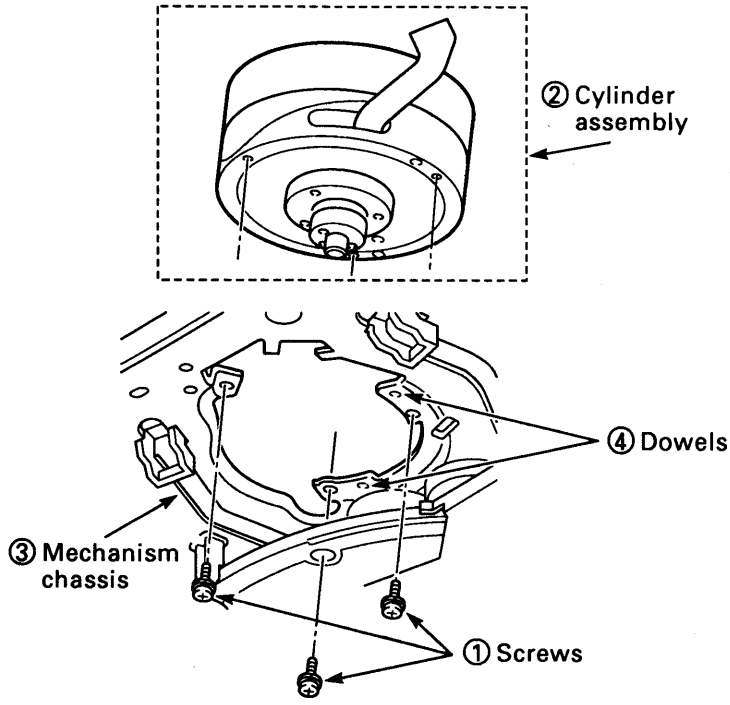

Fig.3-5-7

[Page 22]

3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

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3) Remove the four screws ⑤ and take off the two catcher mountings ⑥.
4) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
5) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
6) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
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4. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

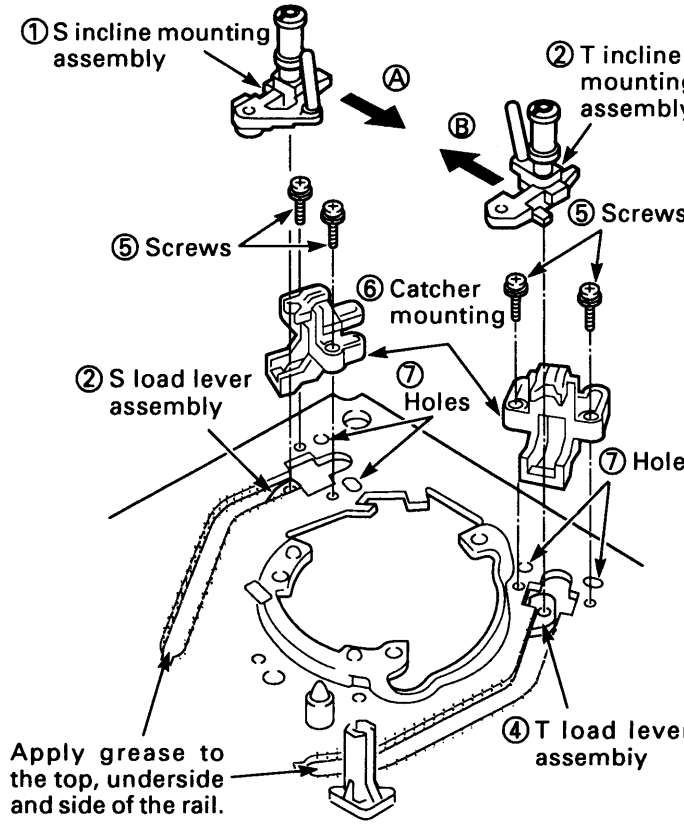

Fig.3-14-2

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